

Figure 1. Honolulu Quadrangle USGS Topographic Map and regional location map.

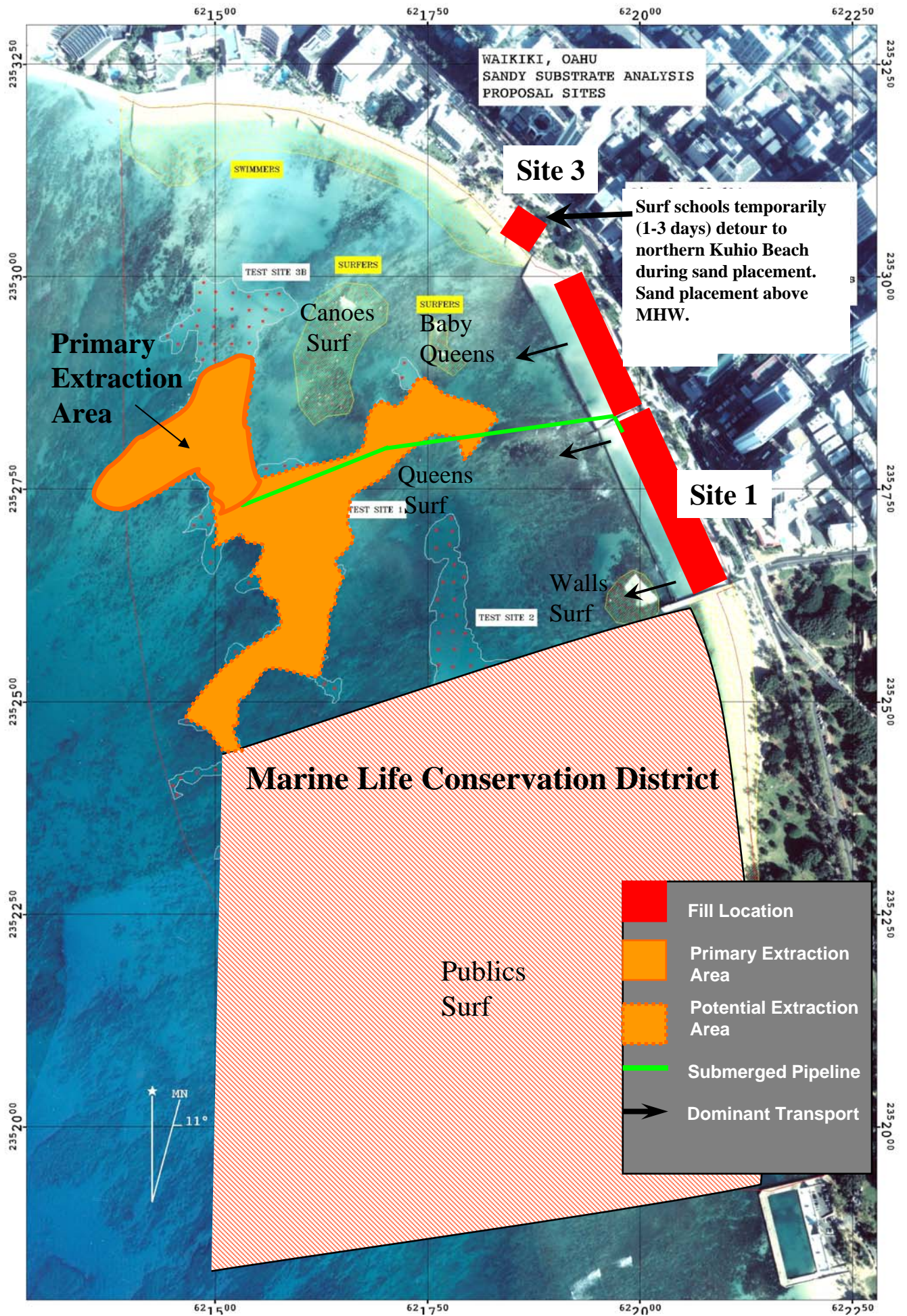


Figure 2. Waikiki Beach Sand Extraction and Fill Locations.

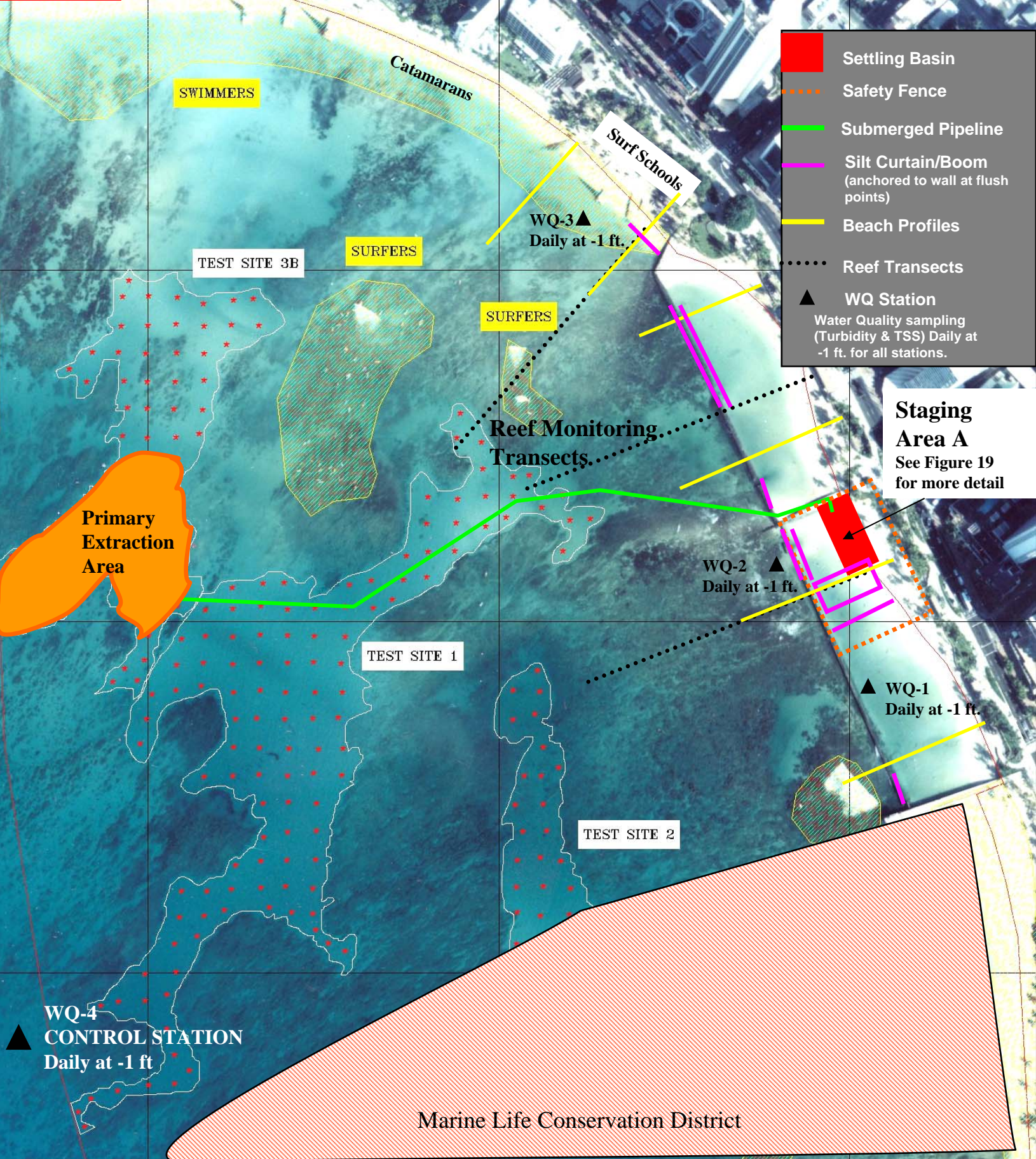


Figure 3. Environmental Monitoring Program

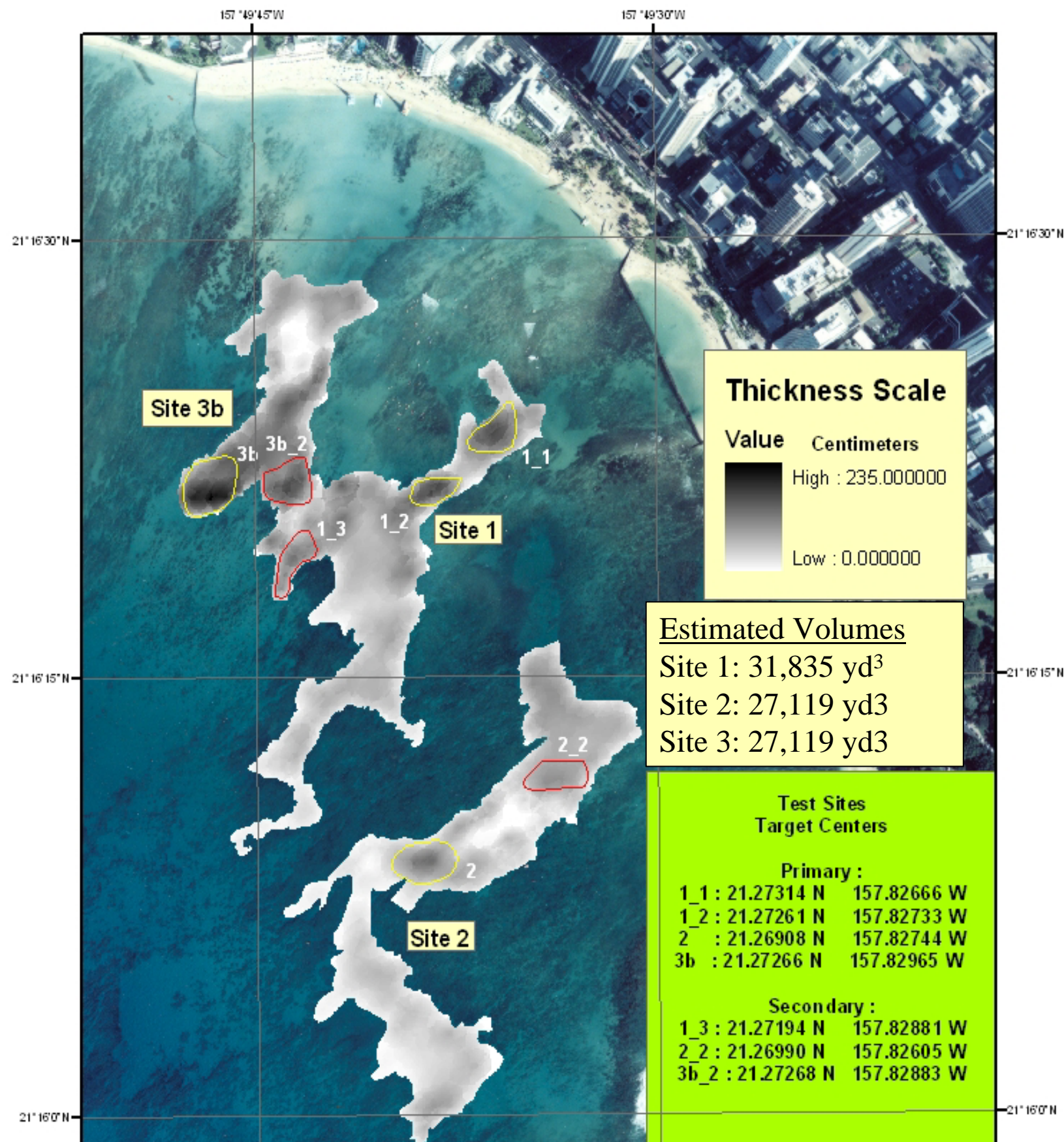


Figure 4. Sediment Thickness, Volume and Location Map

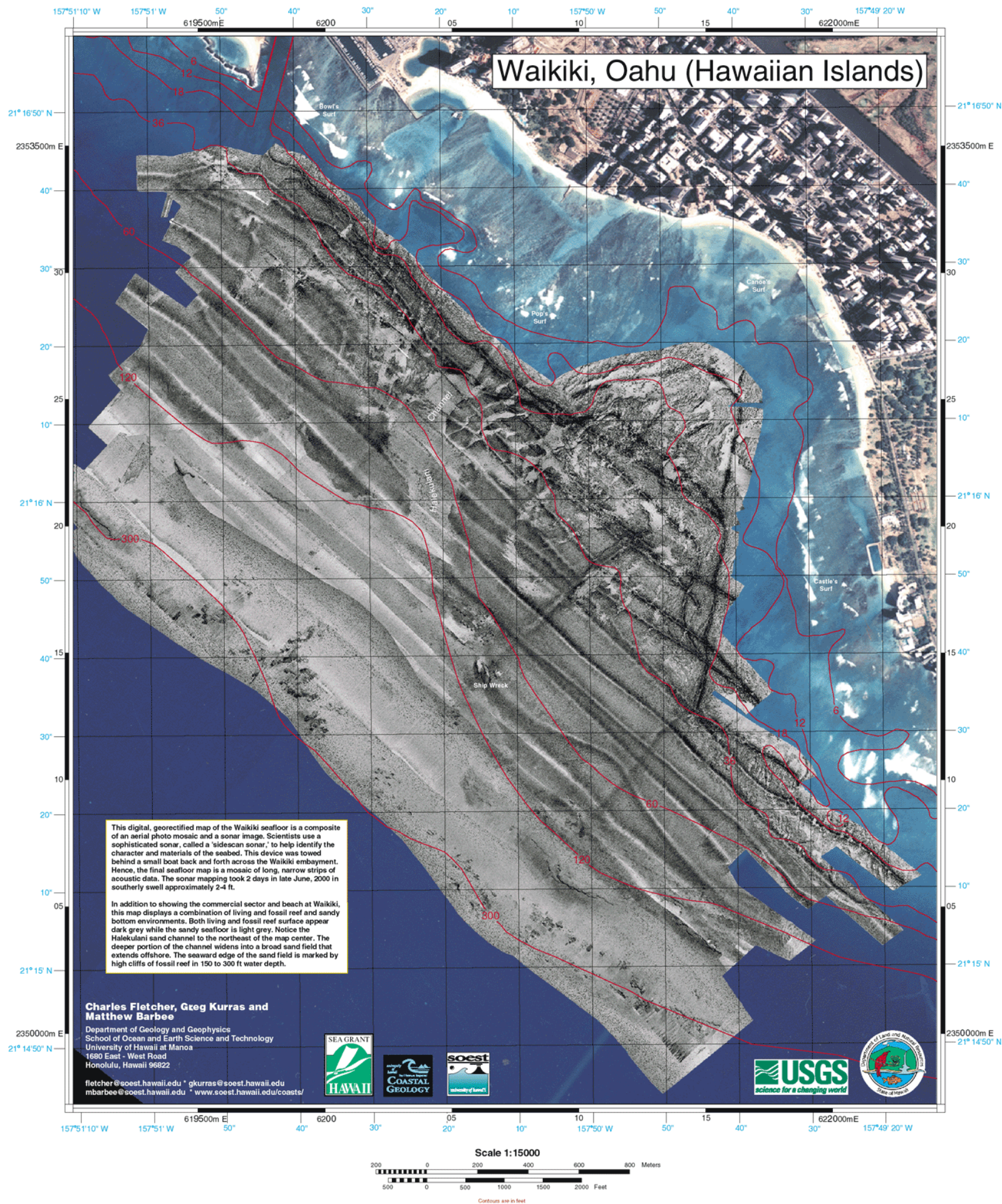


Figure 5. Waikiki Side Scan Image

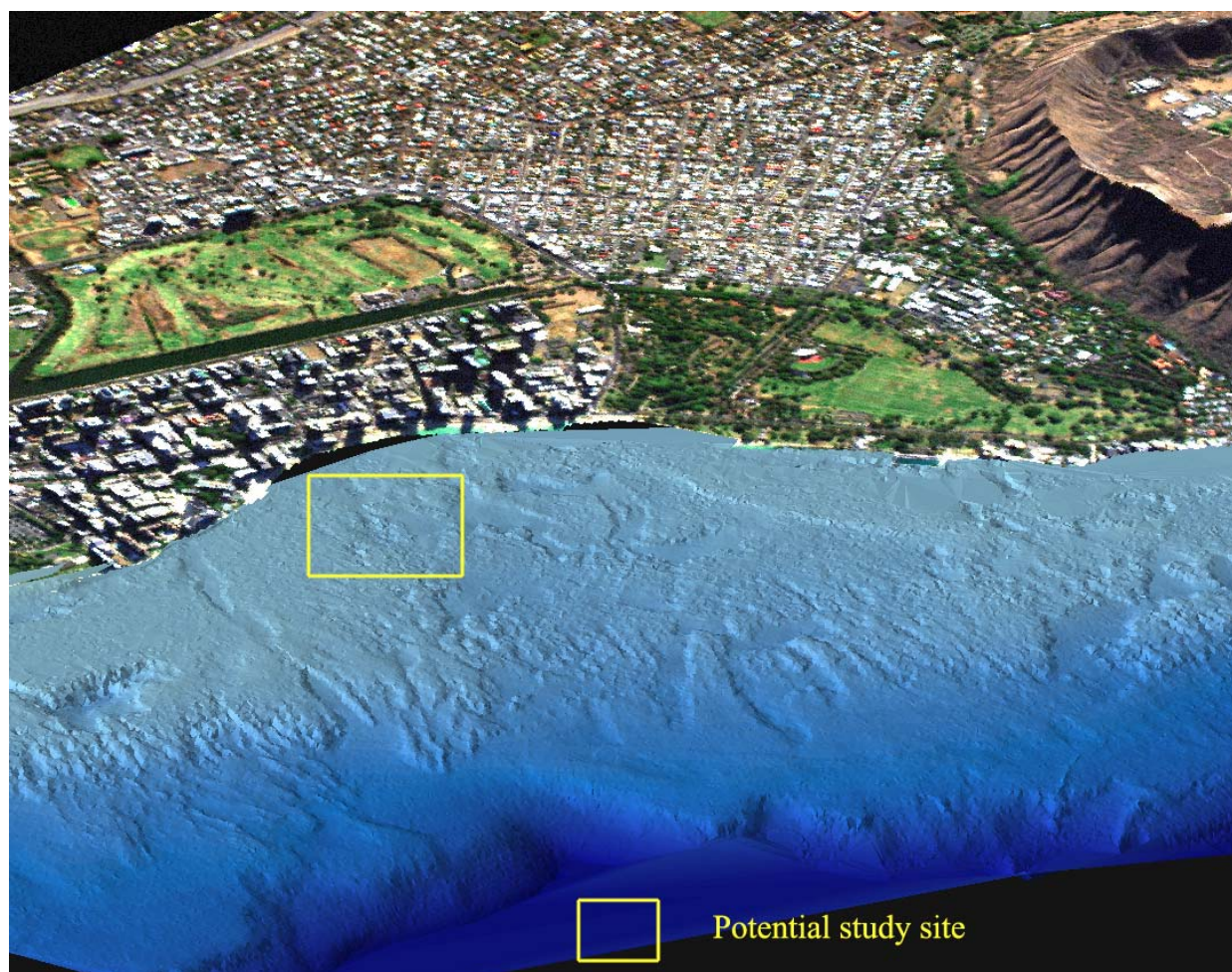
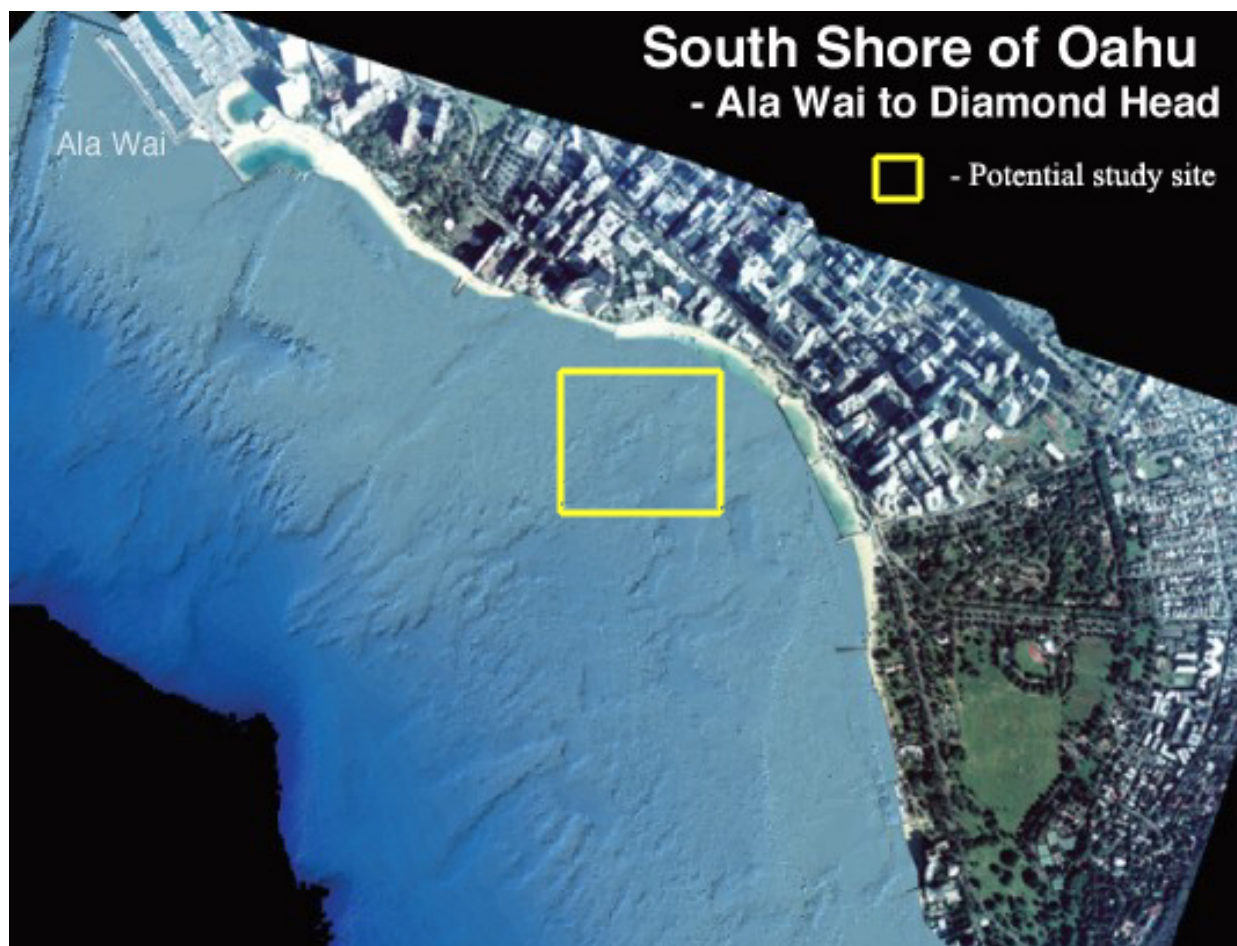


Figure 6. Offshore bathymetry of Waikiki embayment.

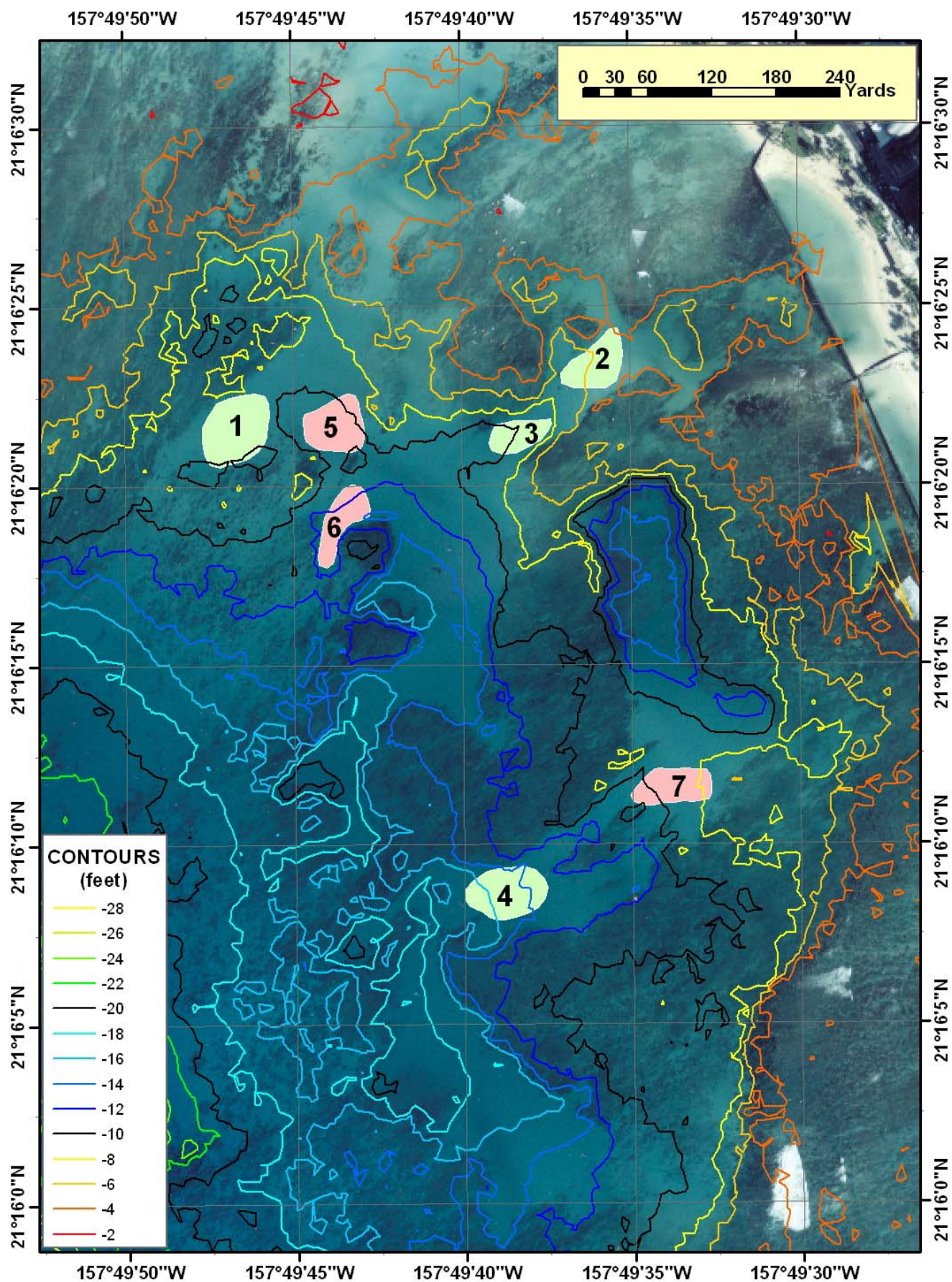


Figure 7. Contoured bathymetry and potential extraction sites.

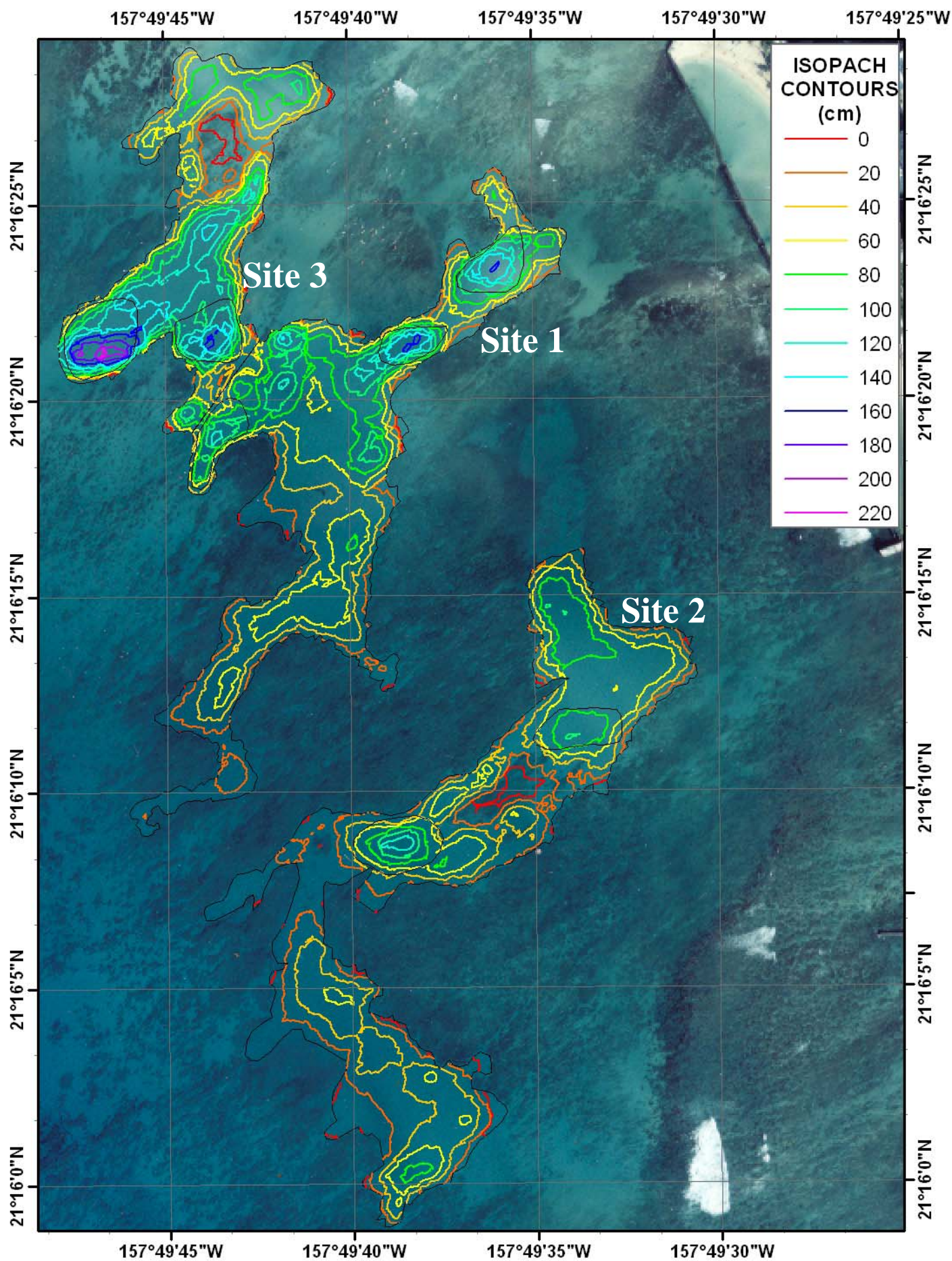


Figure 8. Contoured sand thickness of potential extraction sites.

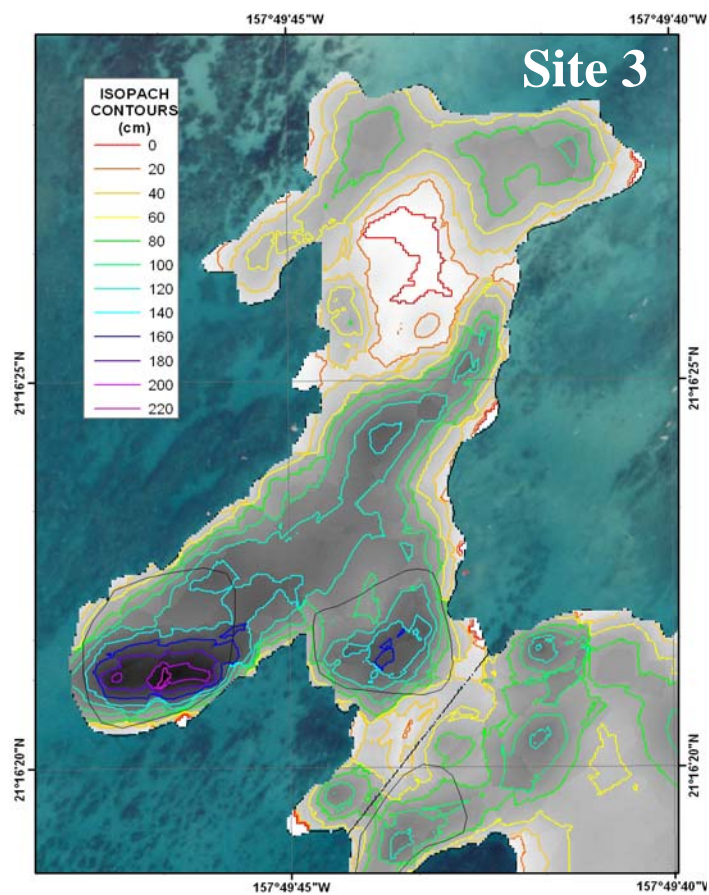
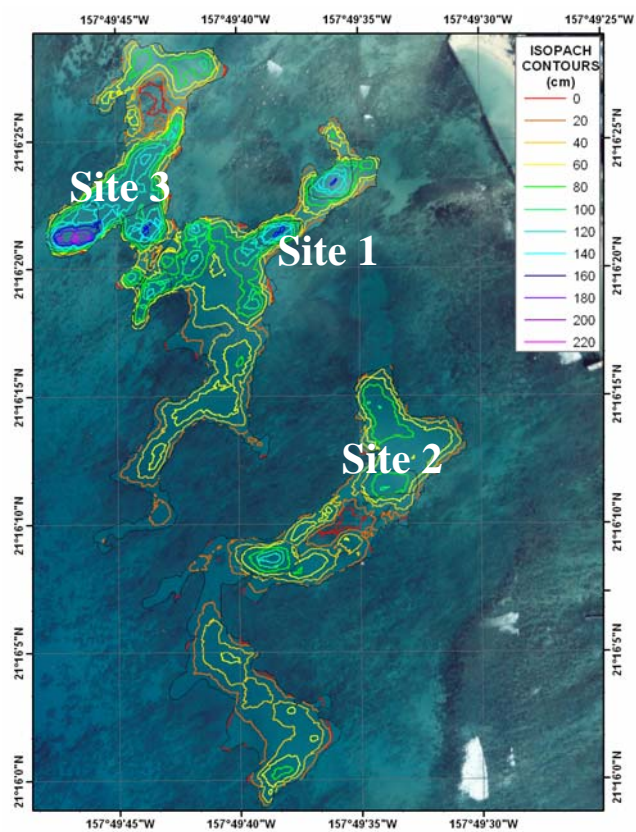
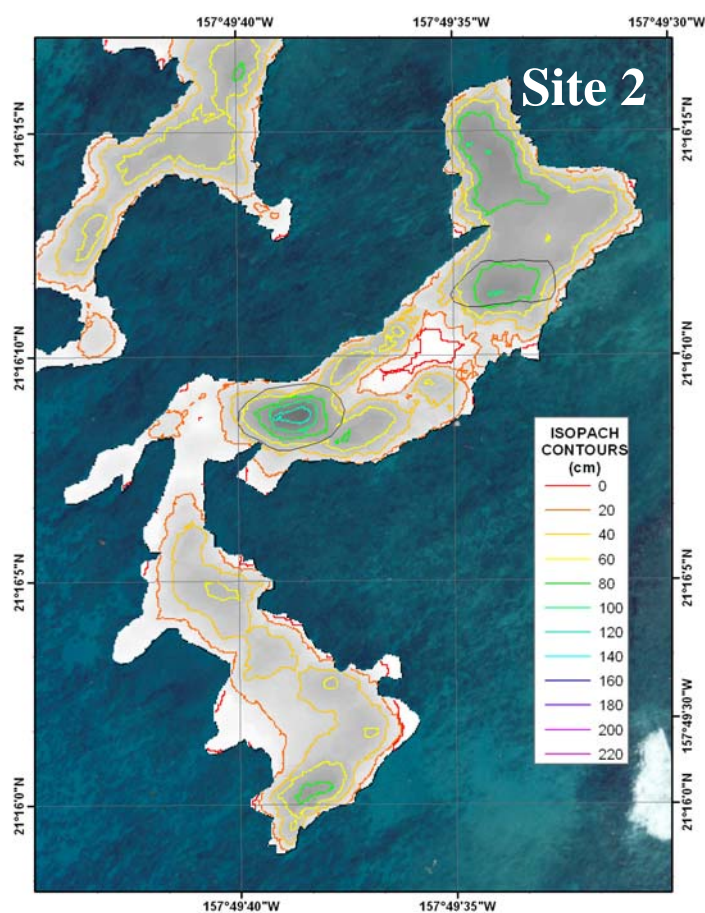
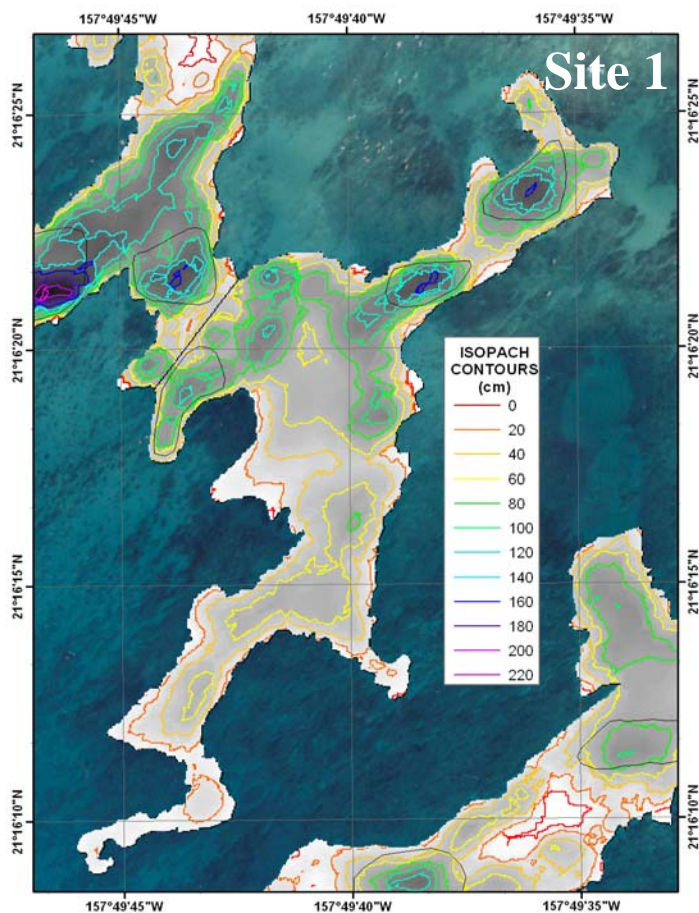


Figure 9. Contoured sand thickness maps (Enlarged).

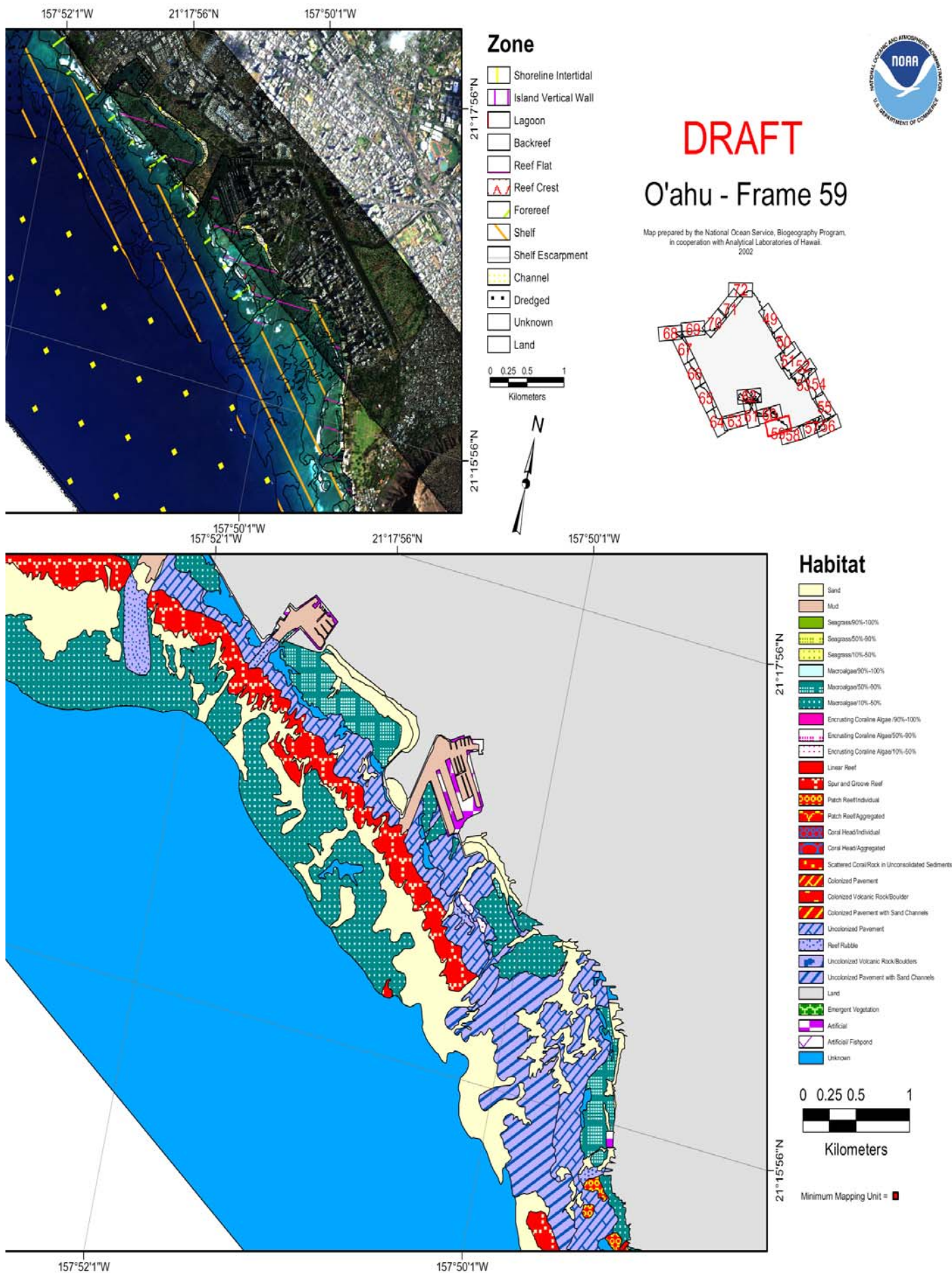


Figure 10. NOAA Benthic Habitat Classification

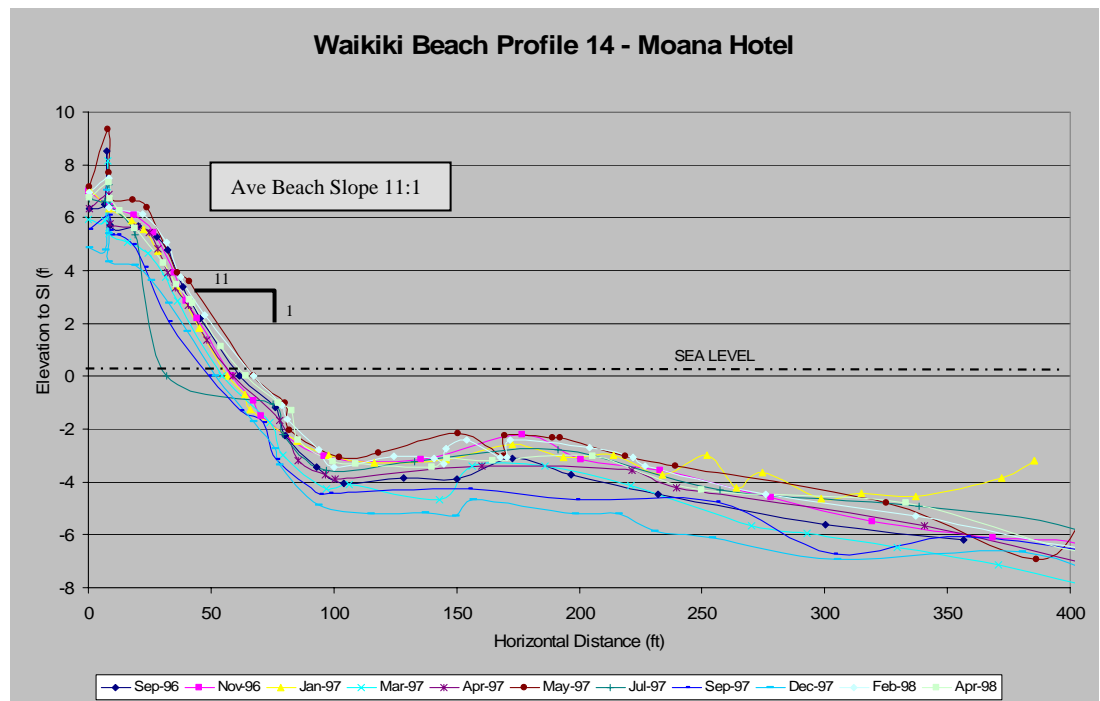
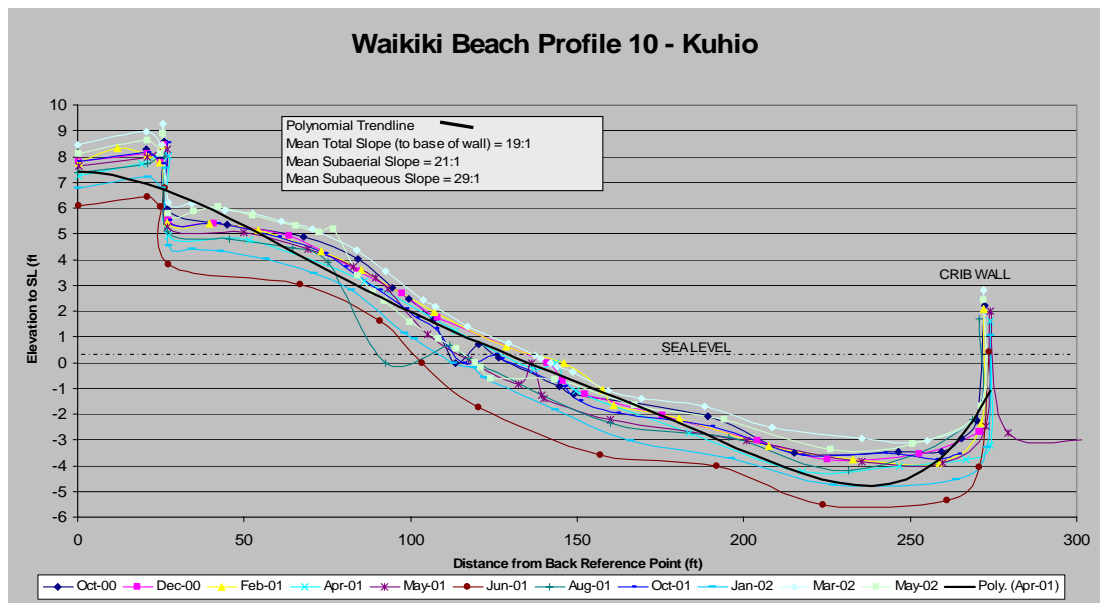
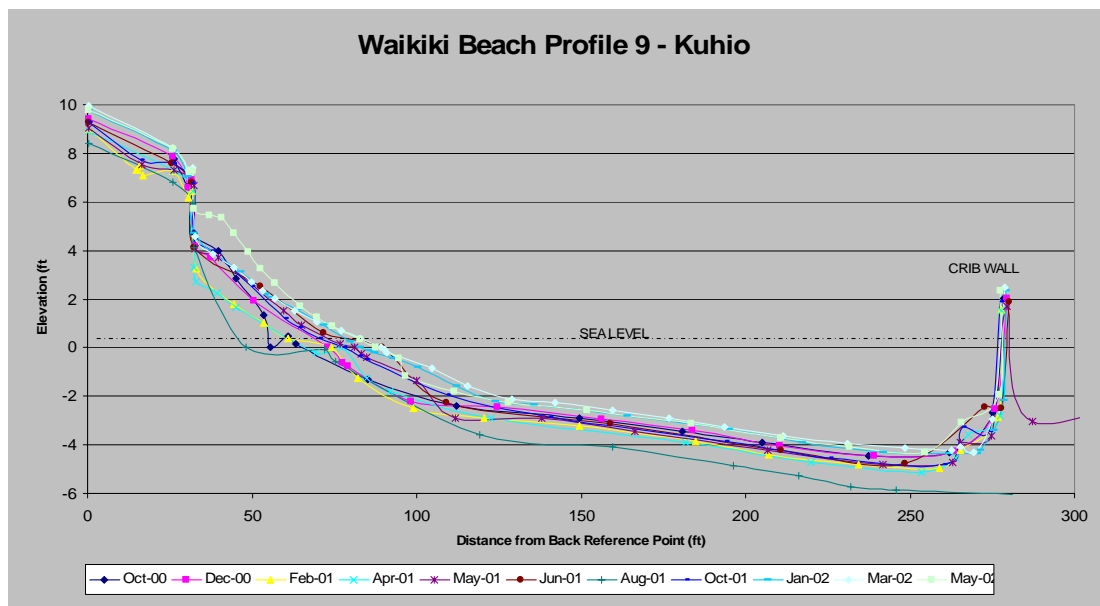


Figure 11. Historical Beach Profiles.

Design Fill Profiles Kuhio Beach

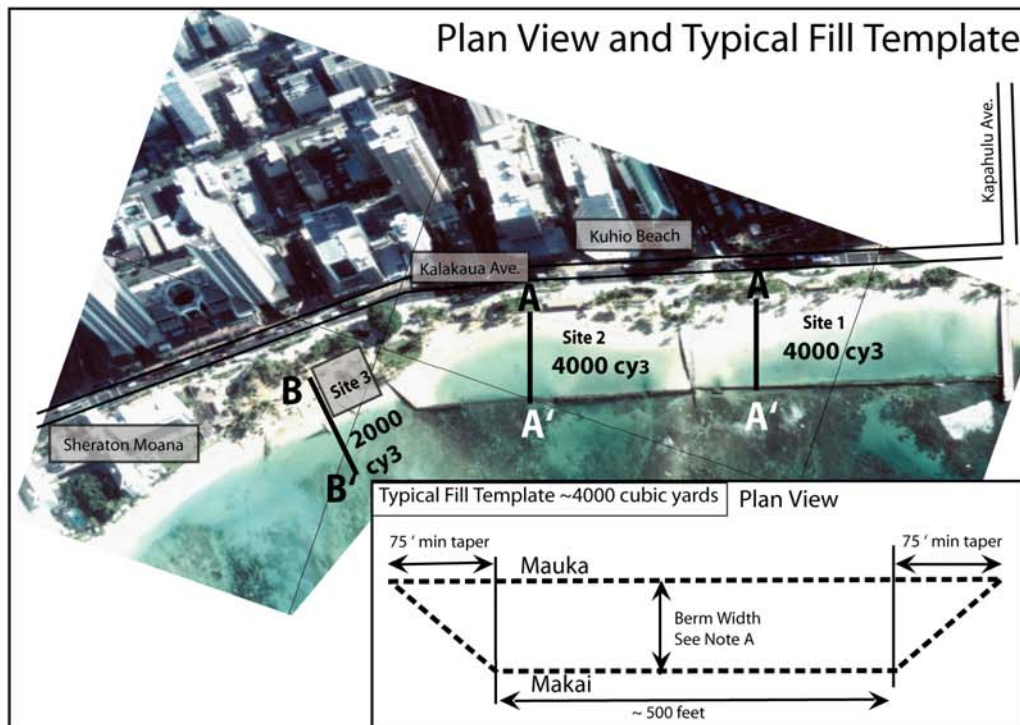
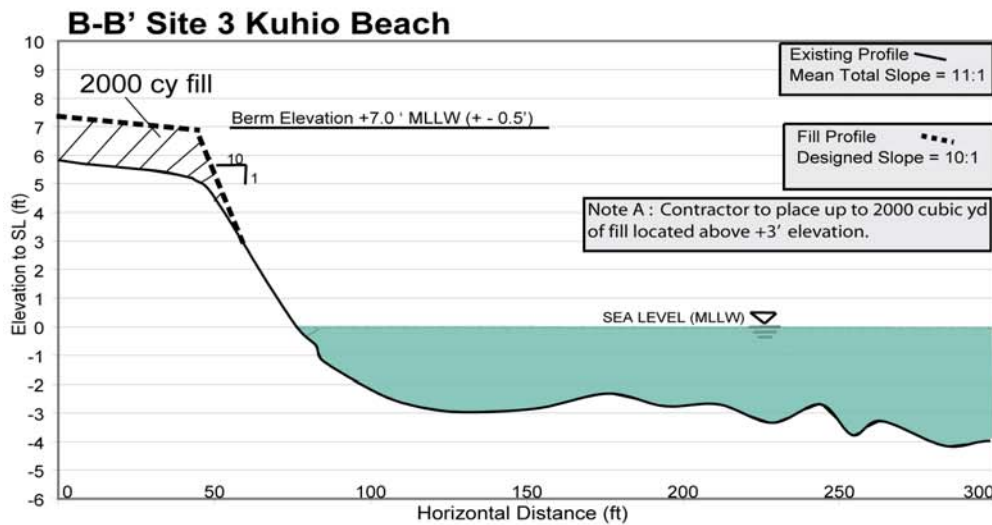
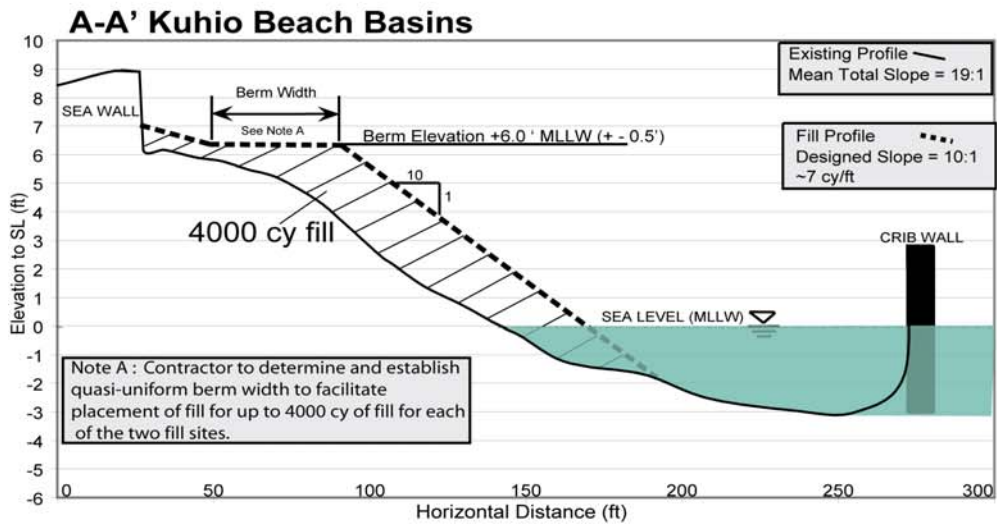


Figure 12. Design Profile and Fill Template.

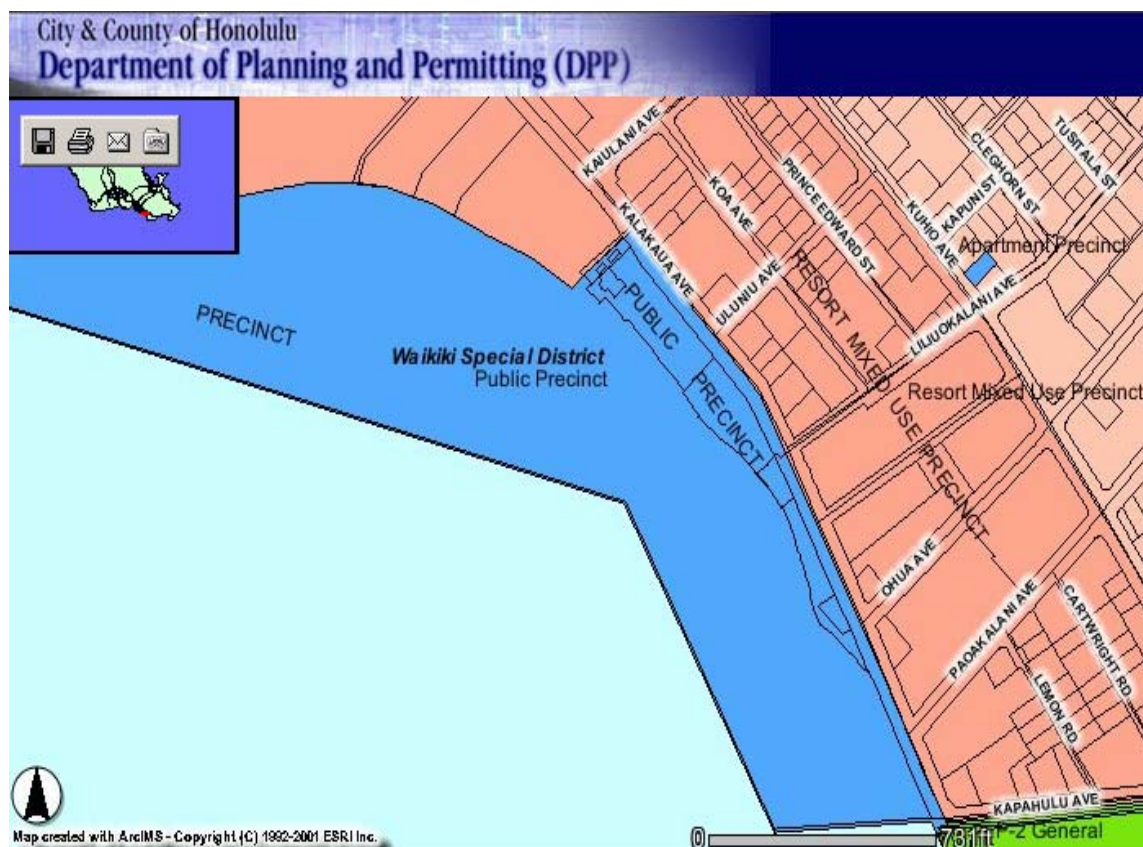
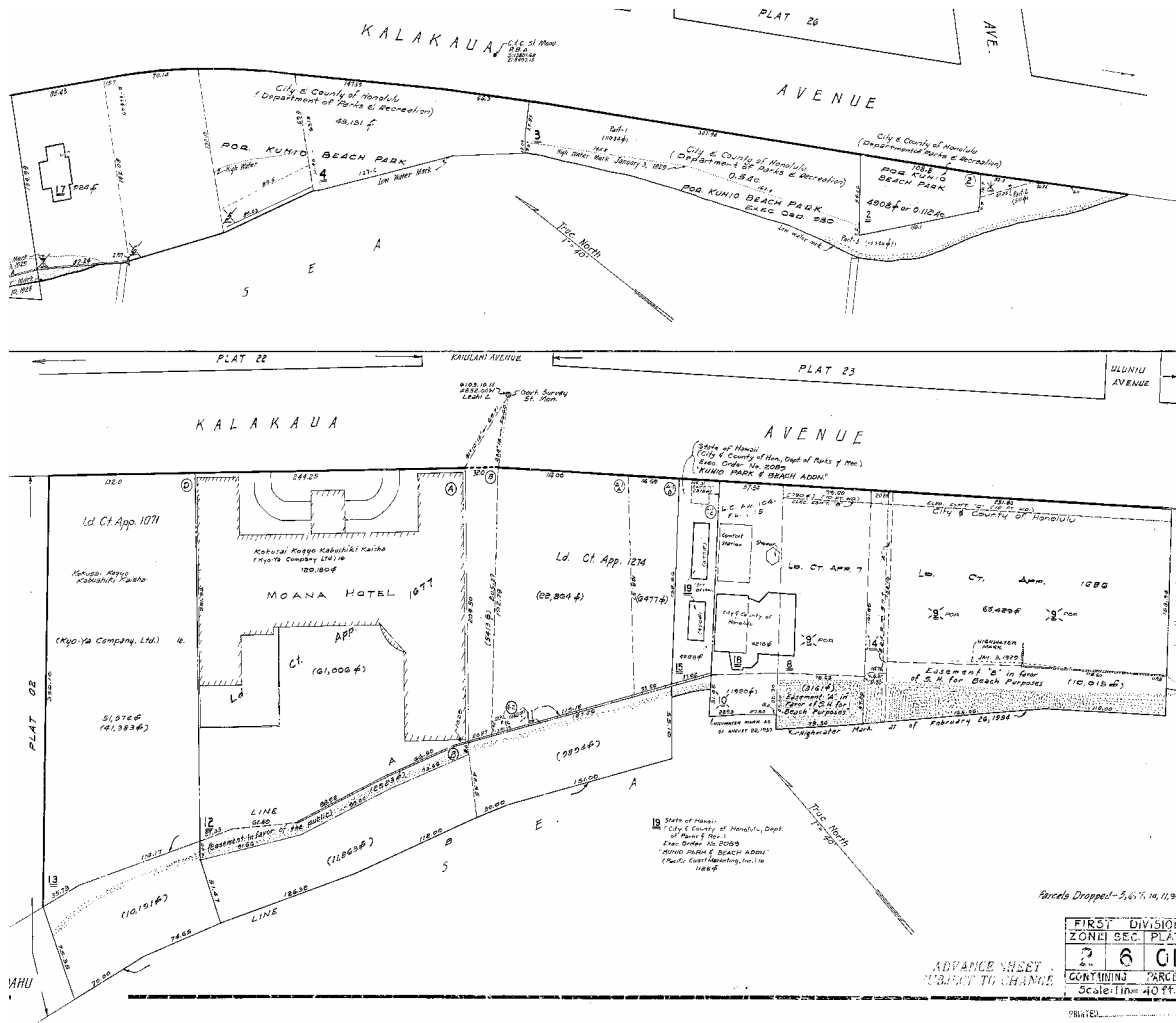


Figure 13. TMK and County Zoning Maps

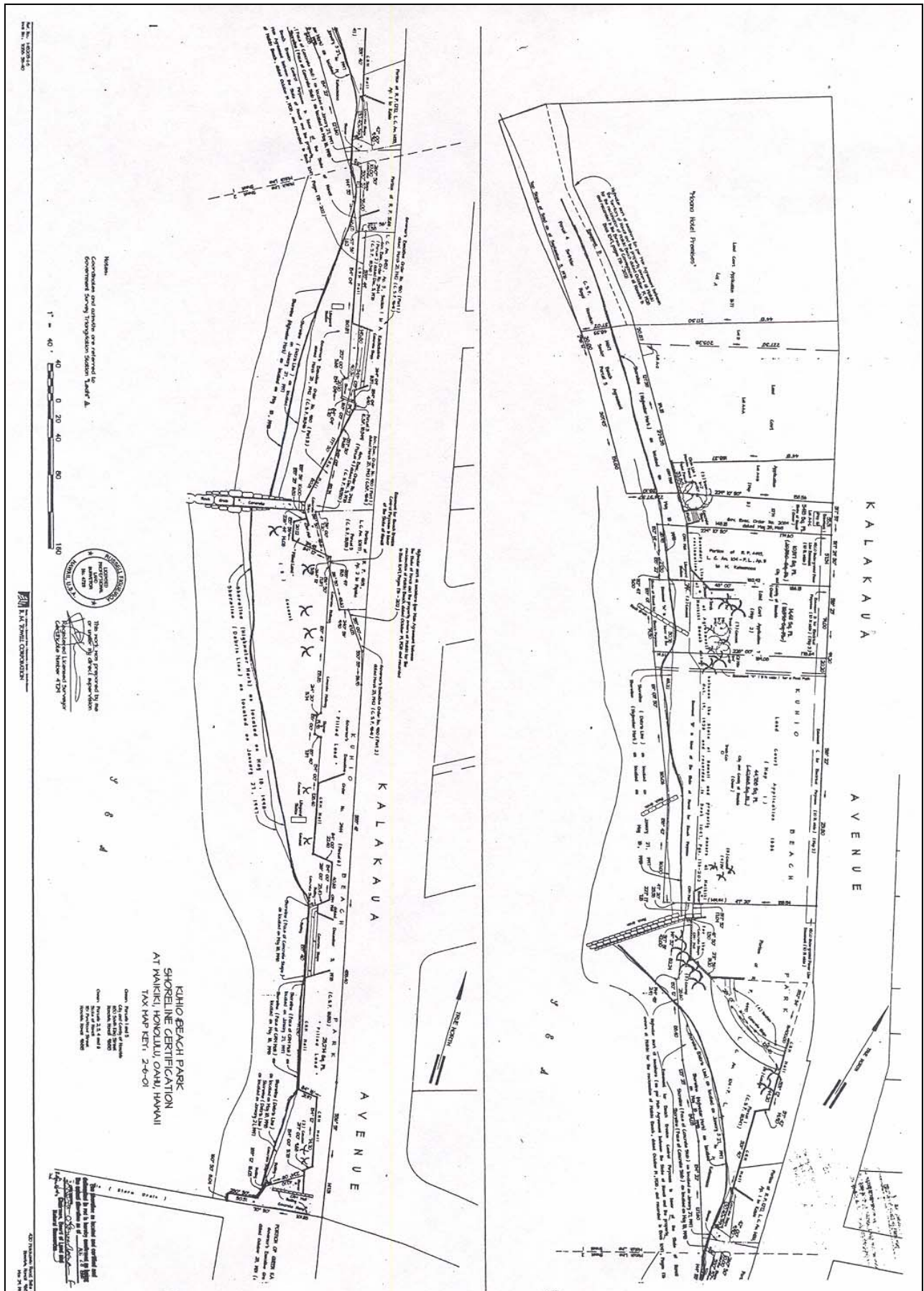


Figure 14. State of Hawaii 1998 Shoreline Certification Map



November, 2003 Beach Conditions- Kuhio Beach



August, 2004 Beach Conditions- Kuhio Beach



Figure 15. Photographs of existing beach conditions.



Figure 10A–G. Modern environmental setting and sand volume behavior by littoral cell, observed from beach profiles. (A) Kaimana Beach: Kapua Channel is an avenue for cross-shore transport. Net longshore transport is to the north, with accretion adjacent to the Natatorium at profile 3. (B) Queens Beach: Net longshore transport is to the north. Interruption of longshore currents by the Queens groin during high wave events can create an offshore rip, responsible for sand loss from the littoral cell. (C) Kapiolani Beach: Profile data indicate a stable setting. Interruption of longshore currents by the

Barge Mounted Hydraulic Pump System

Typical Section for Pipeline

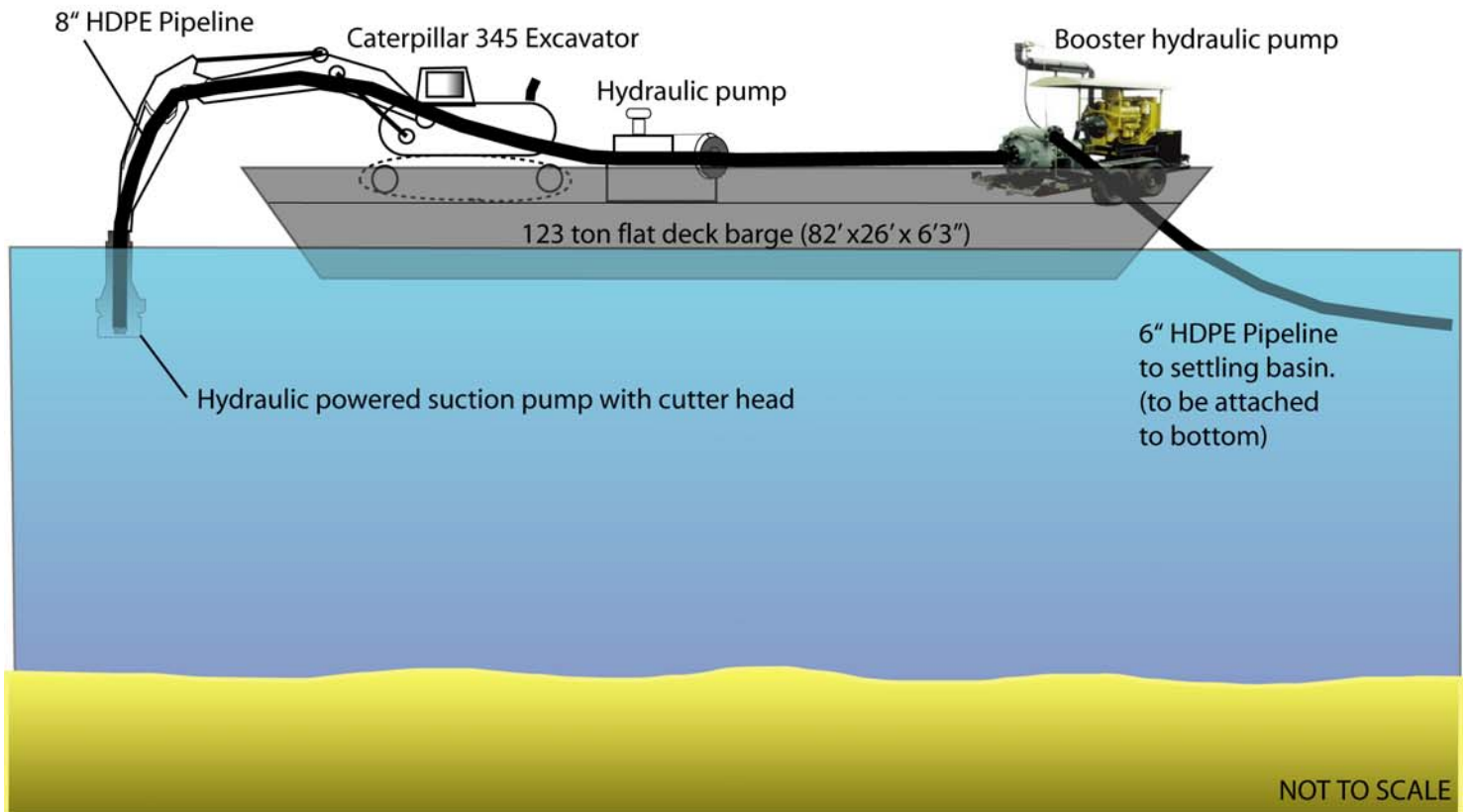
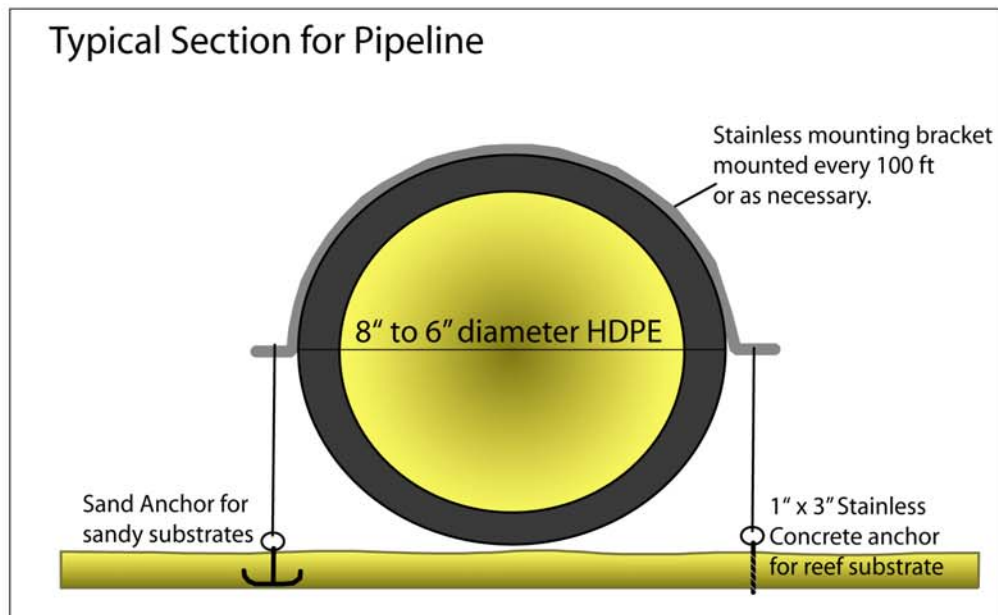


Figure 17. Proposed Barge and Excavator Pump System.

SIX INCH JET RECLAMATION DREDGING SYSTEM

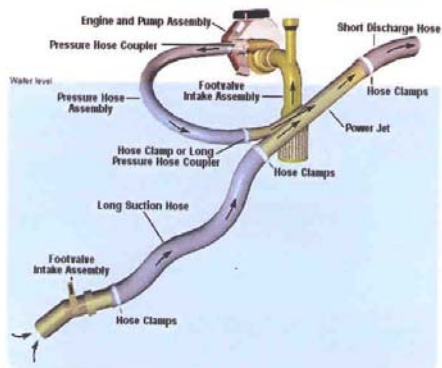
Keene's 6 inch Gravel Pump Reclamation Systems are designed to pump gravel 2000 feet away or lift material as high as 100 feet. These systems are designed for larger projects requiring higher yardage output, longer discharge lengths and higher head capacities. Gravel Pump Reclamation Systems employ vortex style pumps from 2 to 6 inches in diameter that are specifically capable of dealing with gravel and other hard materials. These pumps are constructed of hard alloy steel materials for optimum performance and superior longevity.

A sample of a 6" reclamation dredge pump:



Booster Pump System

Typical Dredging Reclamation System



Proposed Hydraulic Pump System

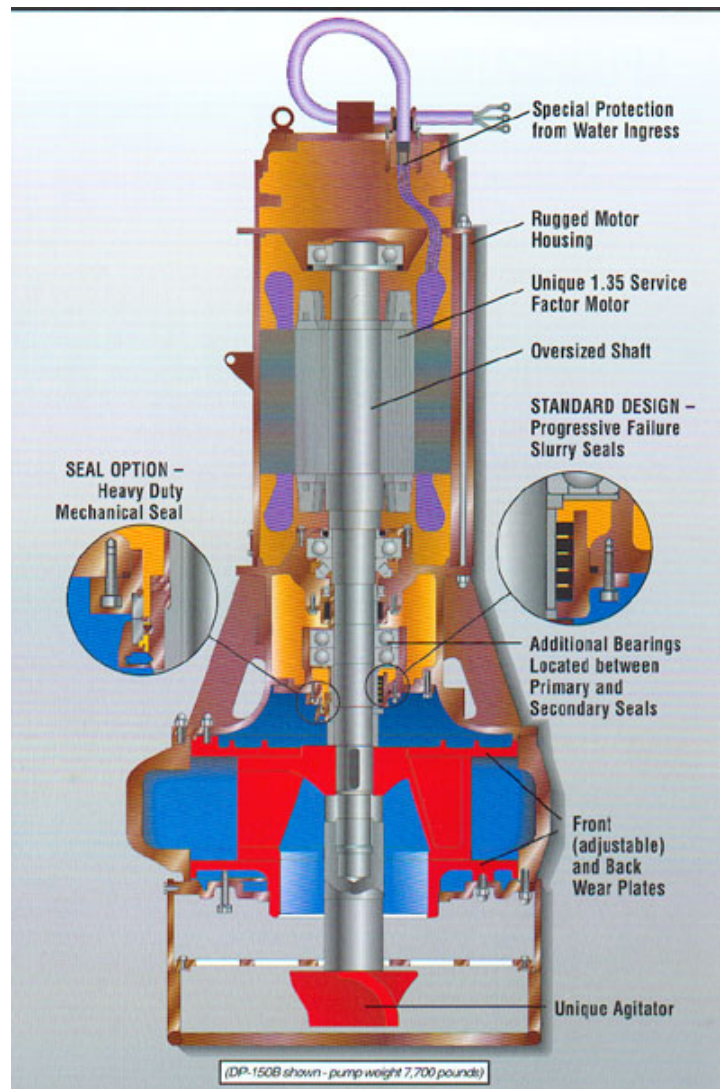
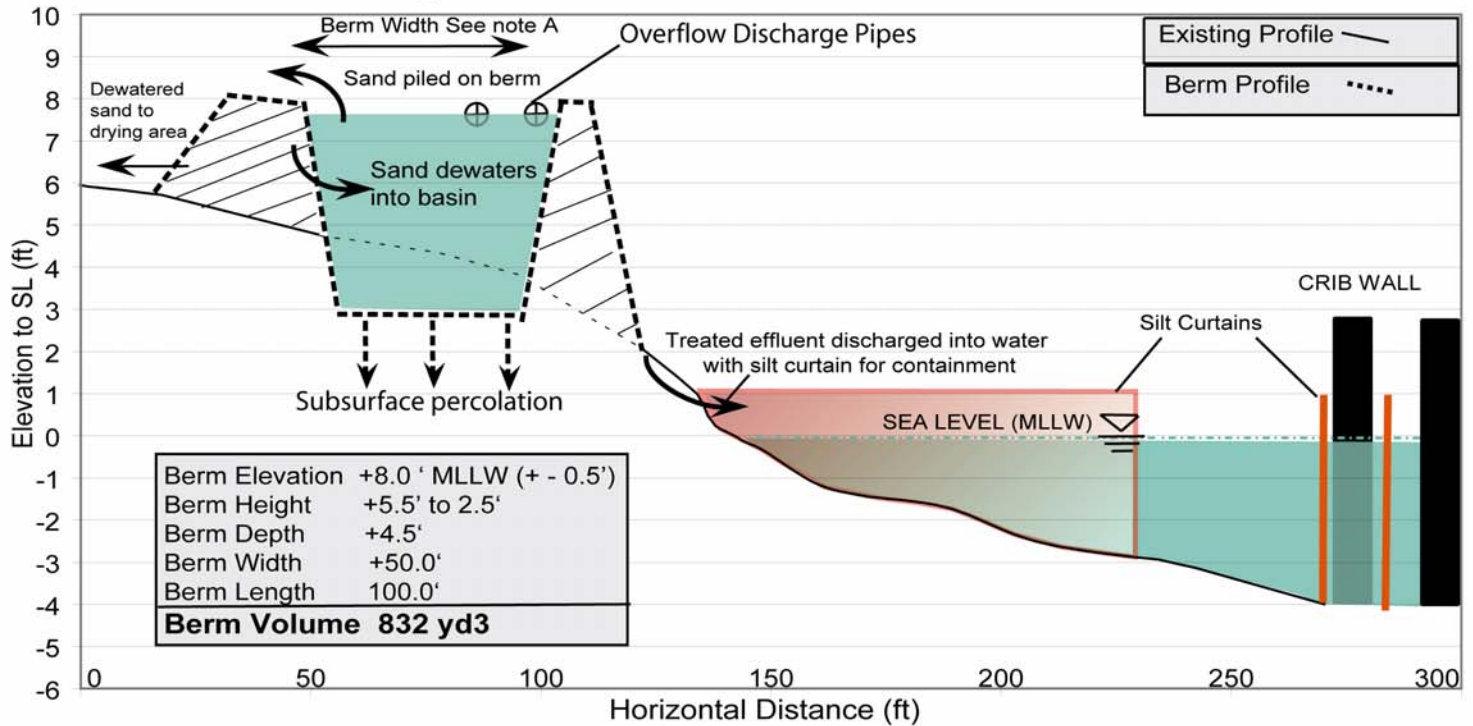
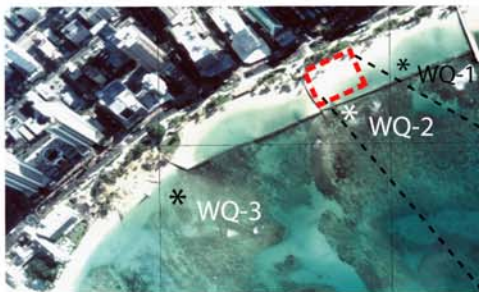


Figure 18. Proposed Hydraulic Pump system.

Settling Basin Profile Kuhio Beach



PLAN VIEW Settling Basin



Kuhio Beach, Waikiki

* Water Quality Monitoring Stations

Staging
Area

Access
Corridor

Settling
Basin

Pipeline

Safety Fence

Notes : NOT TO SCALE

1. Full-depth silt curtains as in Figure 19b.
2. Pumping rates estimated at 100 cy3/hr.
3. Sediment slurry ratio of 10 to 20%.
4. Settling Basin Volume 832 yd3
5. Drying Area 7500 ft2

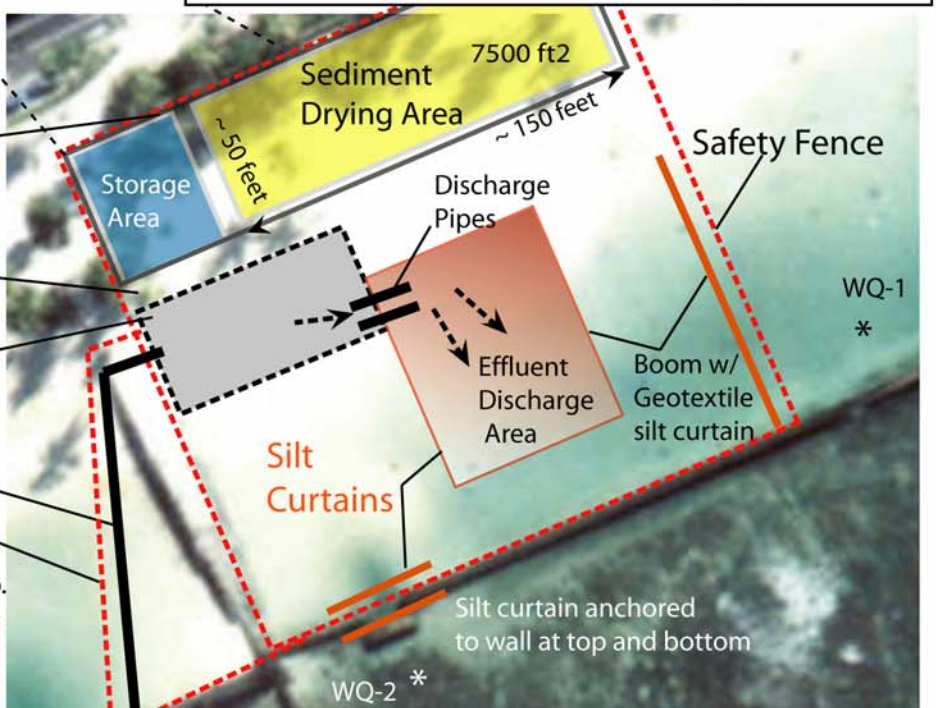
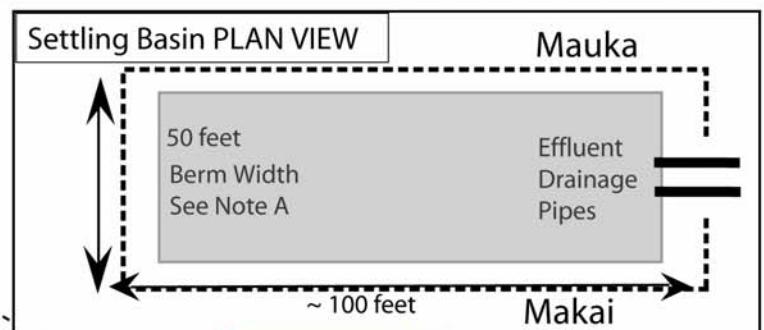


Figure 19. Proposed Settling Basin Design.

Lightweight Turbidity Curtain

Application: Calm waters with little current, such as lakes, ponds, canals and shoreline areas.

Specifications

- Fabric - Polyester reinforced vinyl high visibility yellow
- Connector - Sections are laced together through grommets and load lines are bolted together.
- Flotation - 6" expanded polystyrene over 9 lbs./ft. buoyancy.
- Ballast - 1/4" galvanized chain (.7 lbs/ft).

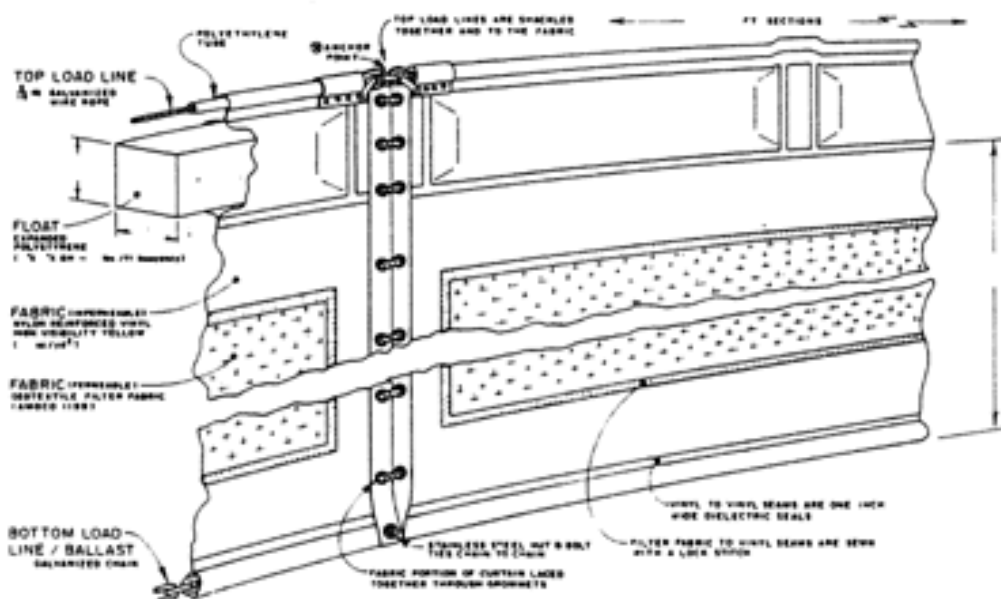
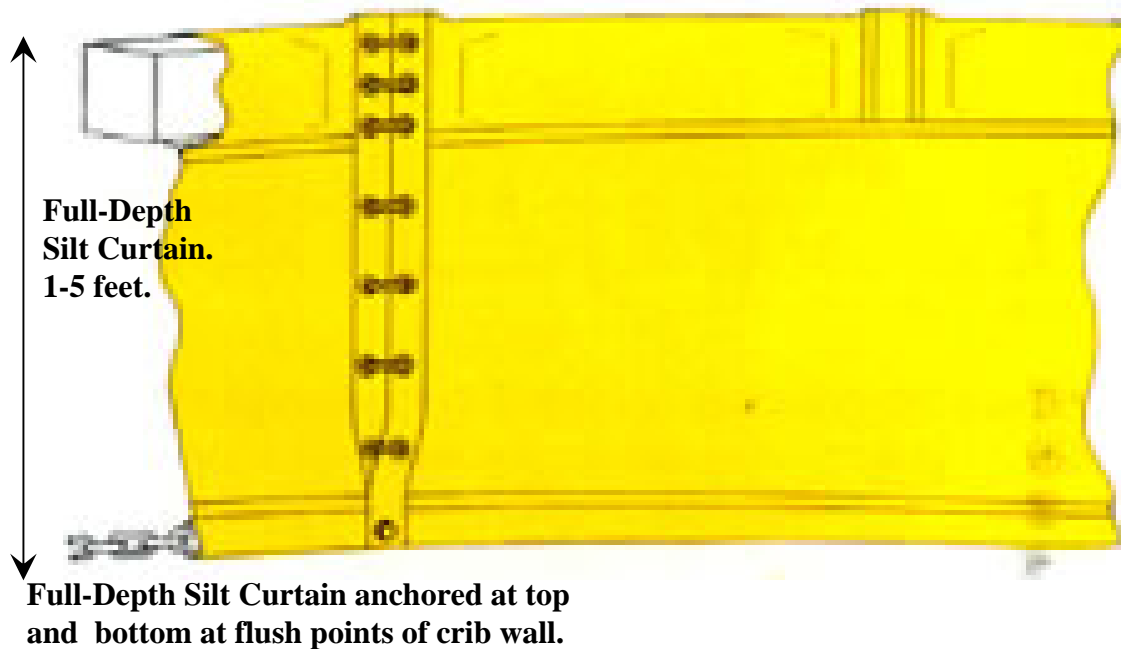


Figure 19b. Full-Depth Silt Curtain Design.

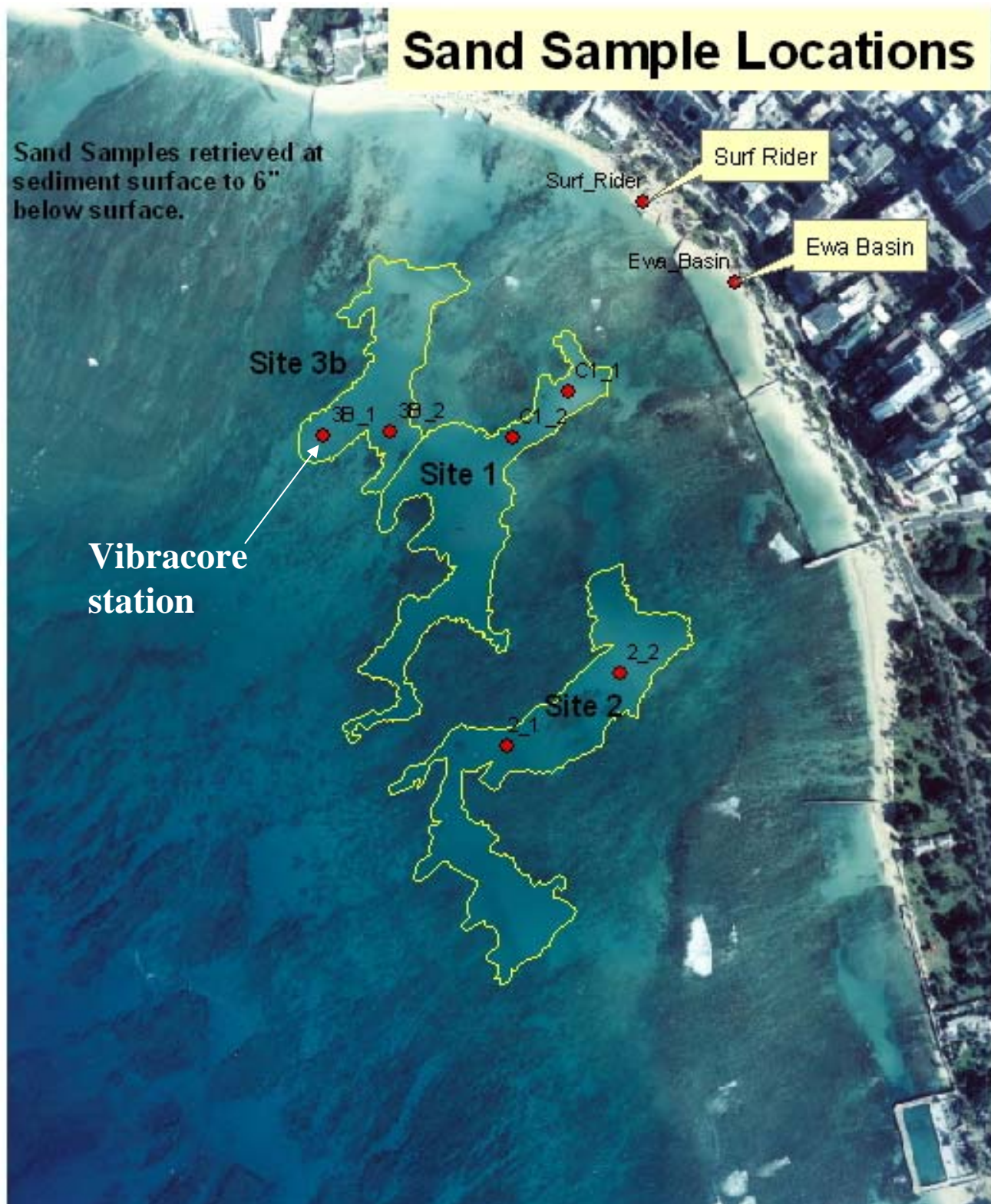


Figure 20. Sand Sample Locations.

Kuhio Beach Sand Grain Size Distribution Cumulative Frequency Plot

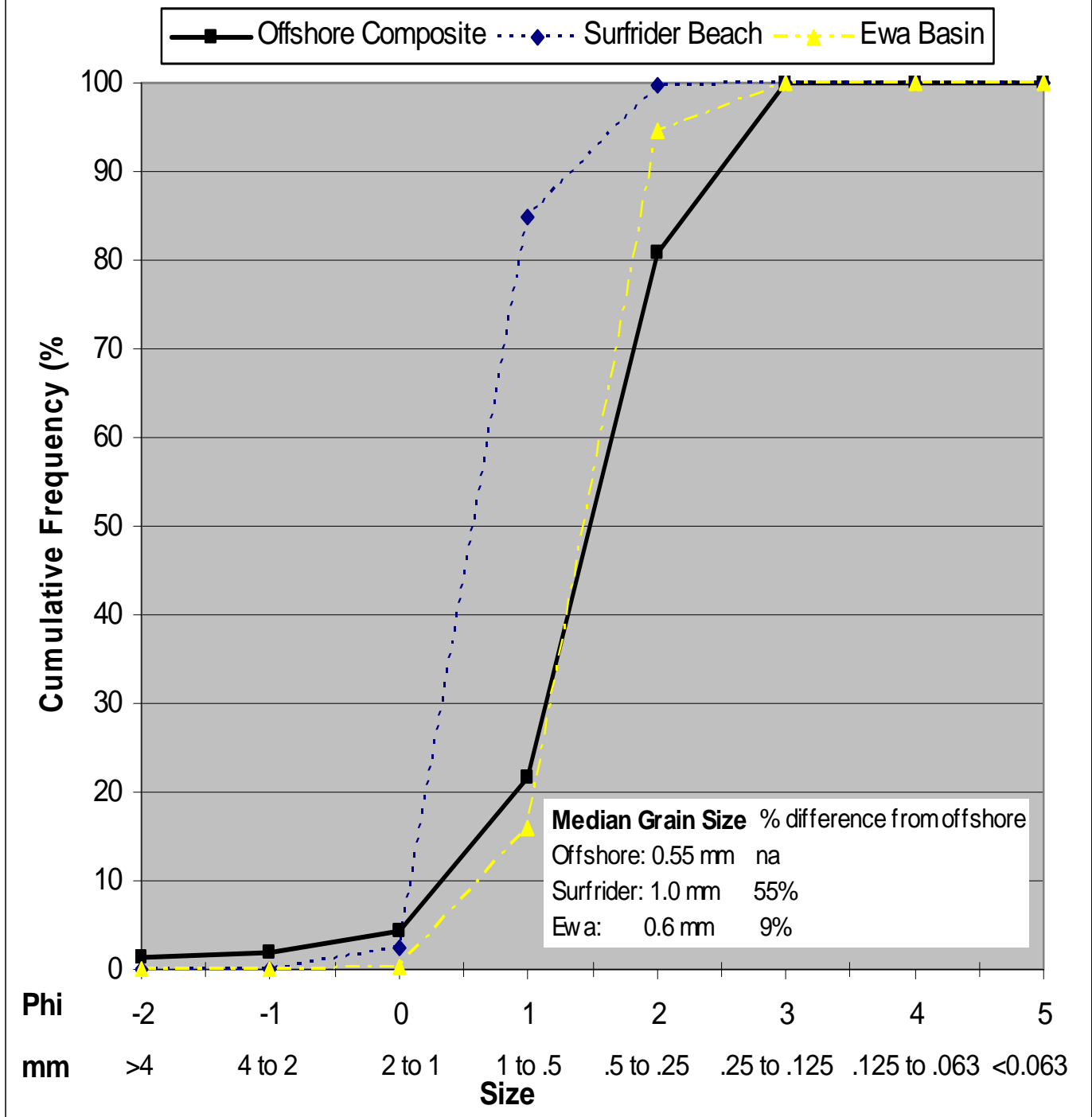


Figure 21. 2004 Grain Size Distribution.



AECOS, Inc.

45-939 Kamehameha Hwy #104

Kaneohe, HI 96744

(808)234-7770 fax: (808)234-7775

CLIENT: DLNR-Coastal Lands Division

P.O. Box 621

Honolulu HI 96809

ATTN: Dolan Eversole / Chris Conger

File No: 2004

Report Date: 9/14/2004

Page: 1 of 2

GRAIN SIZE ANALYSIS RESULTS

Sample Type: sand
Date Sampled: 9/10/2004

AECOS Log No.: 19238

Date Received: 9/10/2004

Fraction dry weight (mg)

size (mm)	>4	2 to 4	1 to 2	0.5 to 1.0	0.25 to 0.5	0.125 to 0.25	0.063 to 0.125	<0.063	TOTAL
phi	2	1	0	1	2	3	4	pan	
VIB-2	2.4	1.3	4.4	33.0	112.6	36.6	0.1	0.0	190.4
Dup	2.4	1.3	4.3	33.4	113.0	35.9	0.1	0.0	190.4

Fraction Percent (%)

size (mm)	>4	2 to 4	1 to 2	0.5 to 1.0	0.25 to 0.5	0.125 to 0.25	0.063 to 0.125	<0.063	TOTAL
phi	2	1	0	1	2	3	4	pan	
VIB-2	1.26	0.68	2.31	17.3	59.1	19.2	0.05	0.00	100
Dup	1.26	0.68	2.26	17.5	59.3	18.9	0.05	0.00	100

Fraction Cumulative Percent (%)

size (mm)	>4	2 to 4	1 to 2	0.5 to 1.0	0.25 to 0.5	0.125 to 0.25	0.063 to 0.125	<0.063	TOTAL
phi	2	1	0	1	2	3	4	pan	
VIB-2	1.3	1.9	4.3	21.6	80.7	99.9	100.0	100.0	
Dup	1.3	1.9	4.2	21.7	81.1	99.9	100.0	100.0	


Laboratory Manager

Figure 21b. Offshore Grain Size Report.



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 Kaneohe, HI 96744 (808)234-7770 fax: (808)234-7775

CLIENT: Coastal Geology Group, UH
 1680 East-West Road
 Honolulu HI 96860
 ATTN: Chris Conger 956-3259

File No:	2003
Report Date:	1/6/2004
Page:	1 of 4

GRAIN SIZE ANALYSIS RESULTS

Sample Type: sand
 Date Sampled: 12/12/2003

AECOS Log No.: **18166**
 Date Received: 12/12/2003

Fraction dry weight (mg)									
size (mm)	>4	2 to 4	1 to 2	0.5 to 1.0	0.25 to 0.5	0.125 to 0.25	0.063 to 0.125	<0.063	TOTAL
phi	-2	-1	0	1	2	3	4	pan	
Surf Rider	0.0	0.1	17.8	616.7	110.6	1.9	0.4	0.1	747.6
Ewa Basin	0.0	0.1	1.1	105.1	524.7	36.0	0.7	0.2	667.9
C1-1	0.0	2.8	3.7	11.9	420.3	75.4	0.2	0.1	514.4
C1-2	0.0	0.2	2.1	23.4	437.5	141.2	0.3	0.0	604.7

Fraction Percent (%)									
size (mm)	>4	2 to 4	1 to 2	0.5 to 1.0	0.25 to 0.5	0.125 to 0.25	0.063 to 0.125	<0.063	TOTAL
phi	-2	-1	0	1	2	3	4	pan	
Surf Rider	0.00	0.01	2.38	82.49	14.79	0.25	0.05	0.01	100
Ewa Basin	0.00	0.01	0.16	15.74	78.56	5.39	0.10	0.03	100
C1-1	0.00	0.54	0.72	2.31	81.71	14.66	0.04	0.02	100
C1-2	0.00	0.03	0.35	3.87	72.35	23.35	0.05	0.00	100

Fraction Cumulative Percent (%)									
size (mm)	>4	2 to 4	1 to 2	0.5 to 1.0	0.25 to 0.5	0.125 to 0.25	0.063 to 0.125	<0.063	
phi	-2	-1	0	1	2	3	4	pan	
Surf Rider	0.0	0.0	2.4	84.9	99.7	99.9	100.0	100.0	
Ewa Basin	0.0	0.0	0.2	15.9	94.5	99.9	100.0	100.0	
C1-1	0.0	0.5	1.3	3.6	85.3	99.9	100.0	100.0	
C1-2	0.0	0.0	0.4	4.3	76.6	100.0	100.0	100.0	

Figure 22. 2004 Grain Size Report.

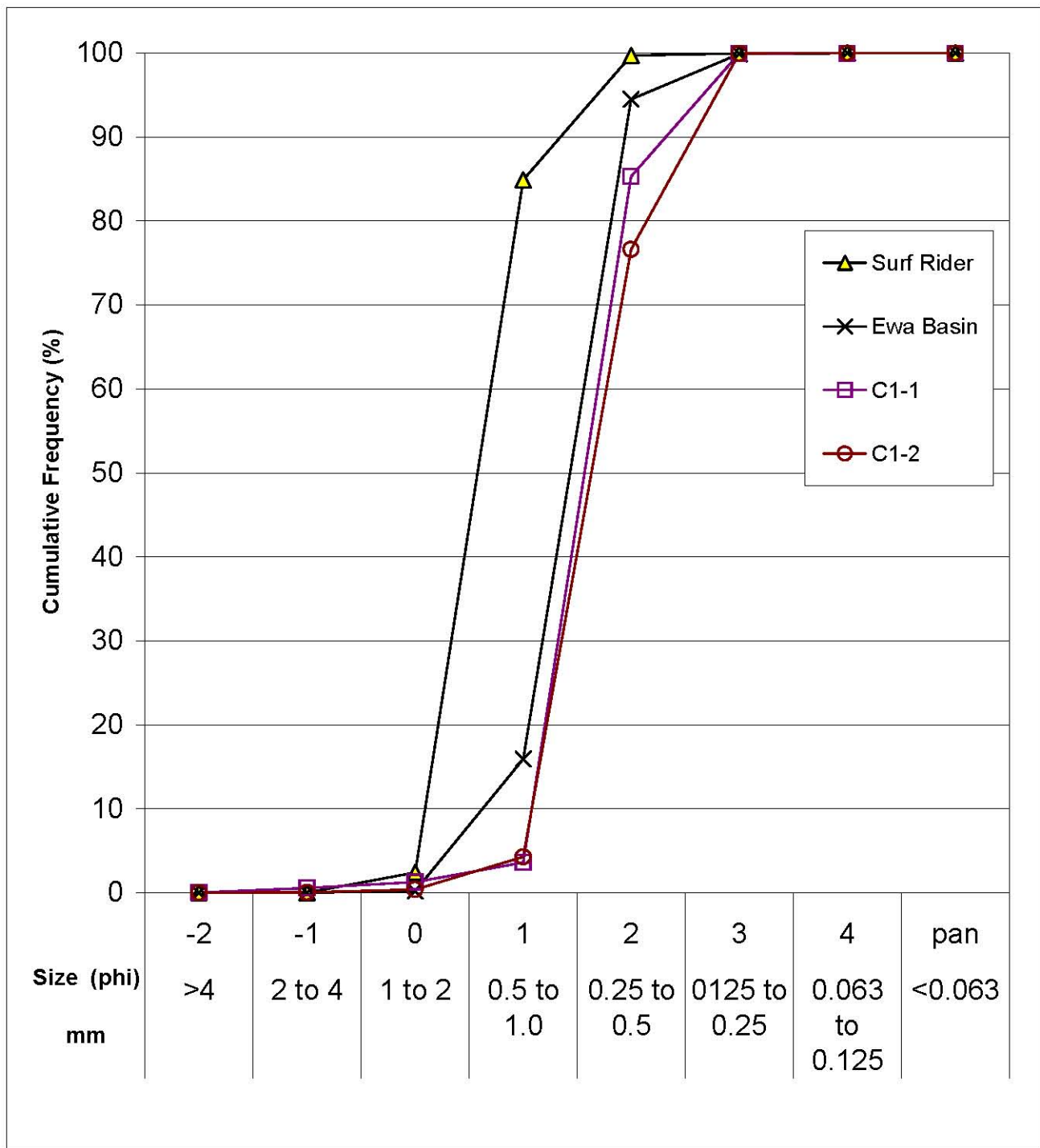
CLIENT: Coastal Geology Group, UH
 1680 East-West Road
 Honolulu HI 96860
 ATTN: Chris Conger 956-3259

File No:	2003
Report Date:	01/06/04
Page:	2 of 4

Sample Type: sand

AECOS Log No.: **18166**

CUMULATIVE FREQUENCY PLOTS





AECOS, Inc.

45-939 Kamehameha Hwy #104

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(808)234-7770 fax: (808)234-7775

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1680 East-West Road
Honolulu HI 96860
ATTN: Chris Conger 956-3259

File No:	2002
Report Date:	1/6/2004
Page:	3 of 4

GRAIN SIZE ANALYSIS RESULTS

Sample Type: sand
Date Sampled: 8/5/2002

AECOS Log No.: **18166**
Date Received: 12/12/2003

Fraction dry weight (mg)

size (mm)	>4	2 to 4	1 to 2	0.5 to 1.0	0.25 to 0.5	0.125 to 0.25	0.063 to 0.125	<0.063	TOTAL
phi	-2	-1	0	1	2	3	4	pan	
2-1	0.0	3.0	5.2	33.7	441.6	6.0	0.2	0.1	489.8
2-2	0.0	1.7	7.9	100.4	443.6	3.9	0.1	<0.1	557.6
3B-1	0.0	0.2	7.3	32.6	453.3	65.4	0.2	<0.1	559.0
3B-2	0.0	0.7	6.3	12.4	437	120.1	0.7	0.1	577.3

Fraction Percent (%)

size (mm)	>4	2 to 4	1 to 2	0.5 to 1.0	0.25 to 0.5	0.125 to 0.25	0.063 to 0.125	<0.063	TOTAL
phi	-2	-1	0	1	2	3	4	pan	
2-1	0.00	0.61	1.06	6.88	90.16	1.22	0.04	0.02	100
2-2	0.00	0.30	1.42	18.01	79.56	0.70	0.02	0.00	100
3B-1	0.00	0.04	1.31	5.83	81.09	11.70	0.04	0.00	100
3B-2	0.00	0.12	1.09	2.15	75.70	20.80	0.12	0.02	100

Fraction Cumulative Percent (%)

size (mm)	>4	2 to 4	1 to 2	0.5 to 1.0	0.25 to 0.5	0.125 to 0.25	0.063 to 0.125	<0.063	
phi	-2	-1	0	1	2	3	4	pan	
2-1	0.0	0.6	1.7	8.6	98.7	99.9	100.0	100.0	
2-2	0.0	0.3	1.7	19.7	99.3	100.0	100.0	100.0	
3B-1	0.0	0.0	1.3	7.2	88.3	100.0	100.0	100.0	
3B-2	0.0	0.1	1.2	3.4	79.1	99.9	100.0	100.0	

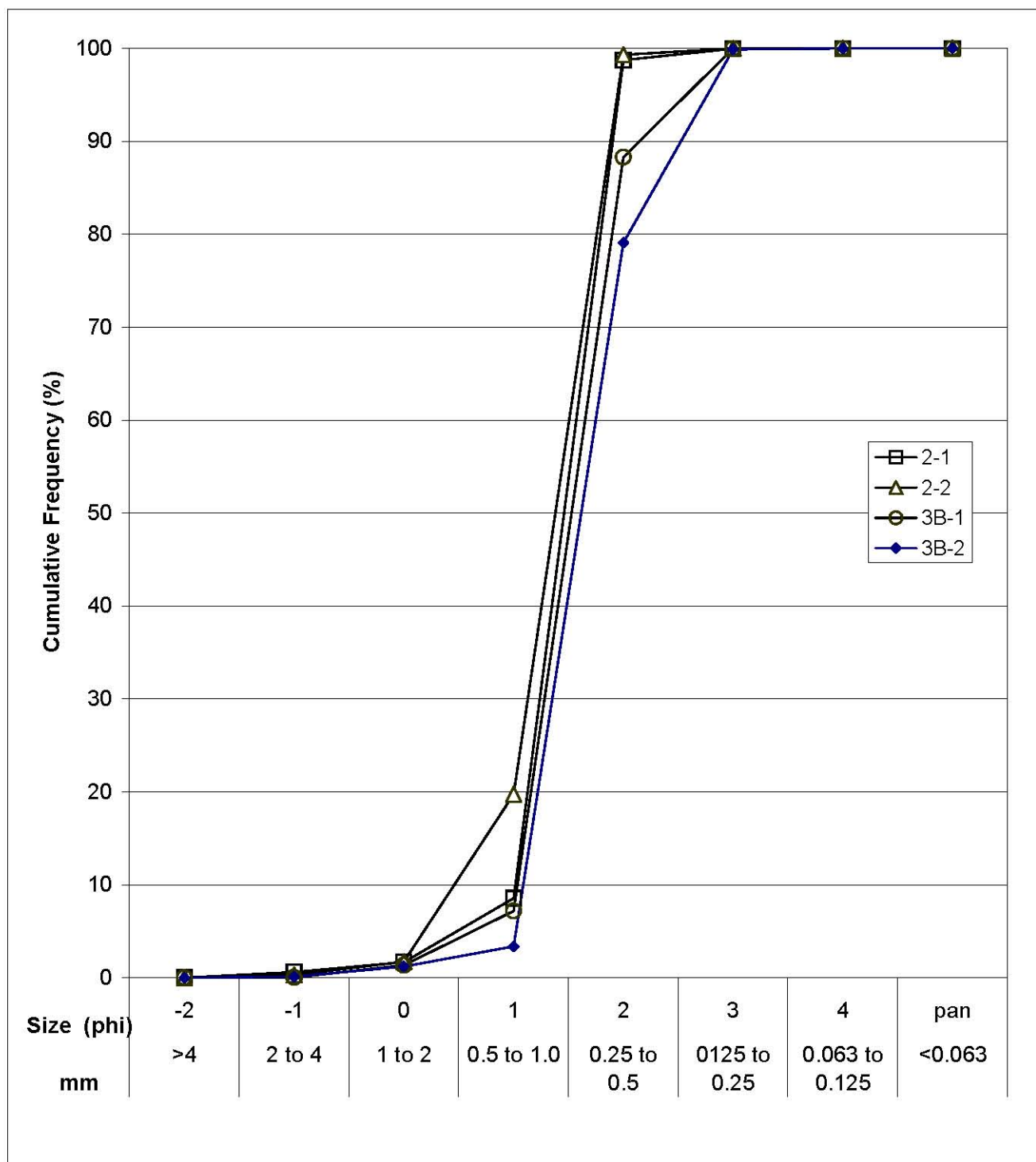
CLIENT: Coastal Geology Group, UH
1680 East-West Road
Honolulu HI 96860
ATTN: Chris Conger 956-3259

File No: 2002
Report Date: 01/06/04
Page: 4 of 4

Sample Type: sand

AECOS Log No.: 18166

CUMULATIVE FREQUENCY PLOTS



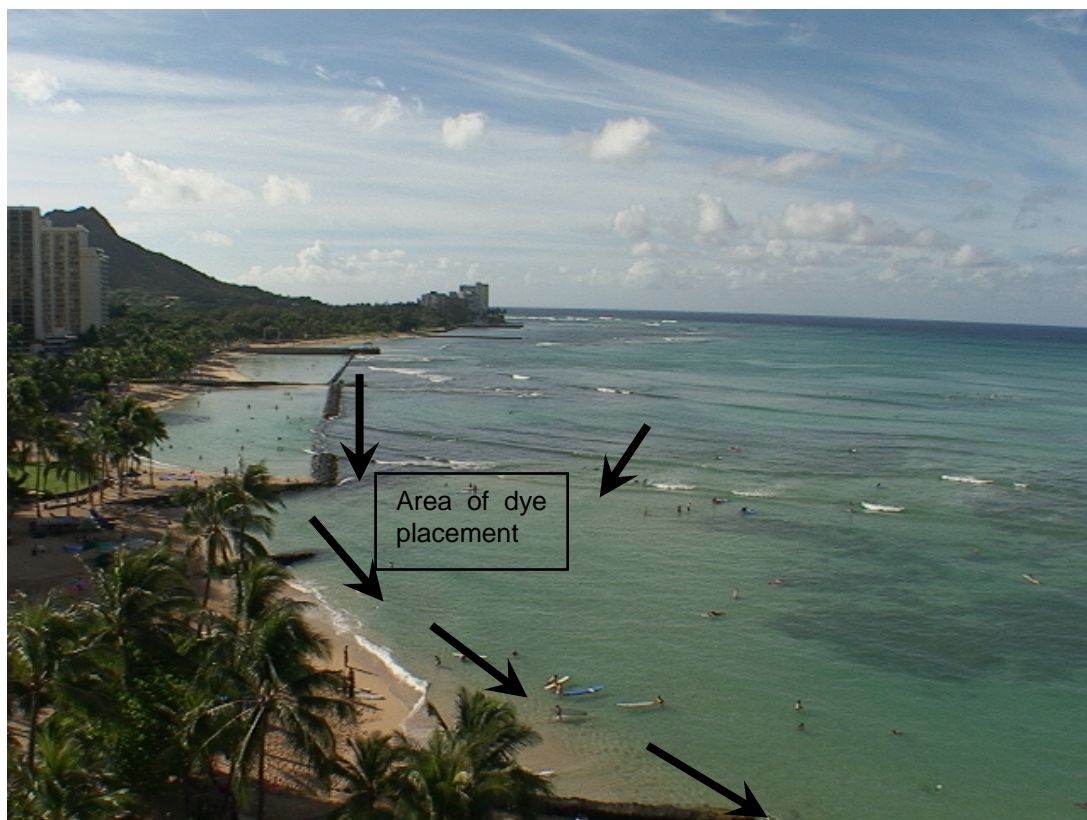
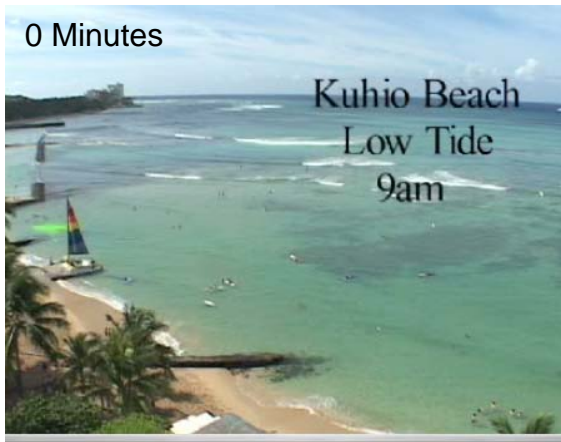


Figure 23. Dye Test Results.